SUPPLEMENT.

The Mining Journal,

AILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

BRITISH COMMERCE IN THE SUPERIOR METALS DURING 1877.

A full third of the present year has elapsed and the expectations of persons interested in British mining and metal manufactures have not been fulfilled; nevertheless, there are various indications of a more favourable turn of affairs. The tin-plate workers of Wales and Staffordshire are more generally employed. A better demand for rails on the part of our foreign customers is inspiring more hope among the manufacturers and miners of iron. The hardware people are somewhat busier. The manufacture of fire-arms has improved at Birmingham, and military and naval cutlery is a little better at Sheffield. The war has no doubt sustained the requirement for steel and copper. Although machinery for the manufacture of arms at St. Petersburgh and Peterhoff has been chiefly imported from America, and the Russians are mainly manufacturing their own implements of war. The copper used for caps, cartridges, &c., the Czar is importing from the United States. About half-a-million cartridges a-day are being manufactured in the Russian arsenals. A British officer of distinction is represented as saying "the Lake Superior copper has a tenacity unequalled by any other in the world." Whether this *dictum* be true or not the same authority states that several thousand tons of it have been recently ordered, and as the Neva is free from ice, and Turkish privateers are not likely to interfere with American commerce, this and other orders of the kind can be executed with promptness. Most of the arms received by Turkey have been from the United States, although some supplies have been derived from Hungary and England. Turkey will take yellow metal sheathing and ship iron and steel from this country. At all events, shipbuilding is much more lively on the Tyne and Clyde, especially the former, than for a long time past—a fact of considerable significance to our miners and metallurgists. In the agricultural districts implements are more generally purchased, the upward movement in corn having encouraged the farmers to employ more labour; and all the building trades are fairly busy, the season having now set in, and the progress of street opening, erection of public edifices, and of workmen's houses have commenced.

Trade is now chiefly retarded by the apprehension that this country may be involved in the contest that is waging in Eastern Europe, Asia Minor, and on the waters of the Euxine and the Danube. These fears have been much intensified by a letter from Thomas Carlysle, not because the public generally attach much importance to his opinion on the course of events or on politics, but because he positively states that he has certain knowledge of its being the intention of the Government or, at all events, the Premier to take steps that must provoke hostilities on the part of Russia, and the recently published despatch of the Earl of Derby gives some colour to the statement. It is to be presumed that such a man as the "Chelsea Philosopher" would not state a known untruth for any purpose; therefore it is inferred that he must be strangely misinformed, or that there is ground for suspicion, and while that is so our commerce will be impeded and investors inspired with the greatest caution. The language of "the Sage" is explicit—*that he knows the fact of Lord Beaconsfield's purpose of interference.* We must live in hope that the public mind will soon become reassured, so as to give us a fair spring trade, which will bring some cheering influence to miners and makers of metals. At all events, it is of the utmost importance to watch the course of our metal trade, and the data supplied by the Custom House are the most reliable which we possess.

Lead mines continue to be most in favour with investors, and to maintain the steadiest markets. The value of our imports for the four months which have closed is stated to be 683,564*l.*, and for the last of these four months 136,515*l.* There are no re-exports recorded in the Custom House Returns, unless the officials of the Board of Trade thought them too unimportant for publication. The value of British lead, pig, sheet, and tubing exported during the periods referred to was 268,621*l.* for the longer space, and 63,255*l.* for the shorter one. The figures quoted show a quiet and steady progress in our lead exports, both for the four months and the month—about 4 per cent. on the former period, and 10 per cent. on the latter. The import trade for the month is not materially different from the corresponding month last year; for the four months it is close upon 122,000*l.* more. The imports of copper ores for the one-third year were 345,078*l.* These supplies were derived chiefly from Chili, Australia, and the Cape of Good Hope. Regulus, including precipitate, was of the declared value of 422 682*l.*, and unwrought or part wrought 1,051,946*l.* These forms of the import were derived from the same sources as the ore. During the month the value of the latter was 92,866*l.*, of regulus 94,856*l.*, and of part wrought or unwrought 280,282*l.* The import of wrought and unwrought has been more than last year to a moderate extent. Regulus was more for the four months, less for the month, and the same was the case to a greater degree with ores.

The re-export shows that for the four months the value was 429,319*l.* for unwrought and part wrought, the only form in which we sent our imported copper away; for the single month it was 64,794*l.*—a decided falling off in both periods. The exports of British copper since the year commenced were worth 286,866*l.* for wrought or unwrought in ingots, cakes, and slabs, and 324,157*l.* for manufactured. During the last month the former was worth 62,042*l.*, the latter 66,536*l.* Mixed or yellow metal sheathing was rated at 420,148*l.* since Jan. 1, and during April at 88,273*l.* The total value of the exports this year of copper from British mines was 1,031,529*l.*, and for April 217,851*l.*—an improvement on the four months, and a decided falling off for the last month. The whole value of our copper trade, exported, imported, and re-exported, was considerable, having been nearly 3,000,000*l.* Comparing this with the commerce transacted in the same metal last year it appears that there is no material difference. It does not appear that we imported any brass, but the exports of British brass were for the four months valued at 119,458*l.*, irrespective of ordnance, of which no account was taken or, at all events, none published. This is a serious falling off from previous years; the amount in the corresponding period of last year was 157,430*l.*, and in the previous year 141,535*l.* During April we exported to the declared value of 23,361*l.*, a falling off for the month quite as heavy as for the third of the year. In April, 1876, the amount was nearly twice as much, and close upon the same for April, 1875. As far as we can make out by closely collating the general returns a decline in the American trade is accountable for this falling off in the manufacture of brass. Zinc or spelter was imported at the cost of 182,120*l.* crude in cakes, and manufactured at 102,433*l.* During the month the values were 59,882*l.* and 28,369*l.* respectively. The export of British zinc or spelter unwrought and wrought brought us 37,580*l.* for the full four months, a slight falling off; and 6514*l.* for the month, a decline of 40 per cent. It is extremely difficult to account for the decline in this trade, for apparently zinc is coming more into use in London, if not in the provinces, especially for business purposes; and in the cities of France, the Netherlands, and Germany the demand is very much greater still.

Foreign tin was received to the value of 351,079*l.*, our supplies being, as usual, derived from the Great Eastern Archipelago and Australia. The decline for the imports of previous years is remarkable, for in the corresponding period of 1876 they were in value 507,803*l.*, and in that space of time in 1875, 621,433*l.* The decline on the month is even more conspicuous, the import having been valued at 71,431*l.*, against 145,593*l.*, and 169,910*l.* in the same month of the two previous years. This may partly be accounted for by the fact that our orders for the export of Banca tin fell off severely. Our re-exports of foreign tin for the whole four months of the year were only worth 61,644*l.*, about one-third that of last year. In April the re-export value of foreign tin was 24,487*l.*, two-thirds or slightly more than the value last year. The cargoes of "re-exported" tin (using a phrase now sanctioned by custom) were of unwrought. Cornish tin was exported since Dec. 31 to the value of 128,694*l.*, 7½ per cent. less than last year, and 24 per cent. less than the year previous; on the month the amount was 41,779*l.*, an advance on both the previous years for the same period. The amount of British tin entering into hardware, machinery, locomotives, scientific instruments, &c., it is impossible to conjecture; but, viewing all the aspects of the trade, it is a declining one.

A considerable trade is done in pyrites, which may be of copper, sulphur, or iron; indeed, during the four months the value was 604,681*l.*, an increase of 25 per cent. as compared with last year, and it is understood that the increase would have been greater but for the large quantities sent from Ireland. Quicksilver is a metal in which our trade is large; we imported this year the money's worth of 247,860*l.*, of which we sold to foreigners quantities for 86,035*l.* The month shows no especial feature for pyrites or quicksilver.

As to the course which our metal exports took it appears that British lead was dispatched very generally to other countries. We have customers in all quarters of the world and in all climates, but the distribution is very unequal. Our best business is transacted in China, especially at Hong Kong; this year our exports thither amounted to 149,529*l.*—a splendid increase upon previous years, although our exports to no other places approached those to China on any of these occasions. Australia is usually our next best customer, but the market there is very variable. The consumption of British lead increases steadily in India. With France our commerce in this metal has seriously declined. With the United States it had fallen off very much, but now shows a rapid advance. The trade in this article with Russia is unimportant and fluctuating.

The course of our copper exports has even been more varied than that of lead, France, Holland, Belgium, Germany, and British India dealing with us for unwrought copper in ingots, cakes, or slabs; the same countries, with Turkey, Egypt, British India, and Italy, purchasing wrought or manufactured. Of these France has been this year the best customer for copper unwrought in ingots, cakes, or slabs; Germany, Holland, and British India follow as named.

The tin exported has been all or very nearly all unwrought, and France, always our best customer for this commodity, was so this year, although a marked decline from last year has occurred. This trade with Germany was once very important; but our Dutch rivals, it is to be presumed, supply that market, as our exports to Germany rapidly decline. The United States, once a great customer, dropped off; but this year they have taken 2½ times more than in the corresponding period last year. The trade with Russia slowly increases, and with Turkey as gradually declines.

We perceive that a contemporary of some commercial celebrity denies that trade is, on the whole, bad. Speculation has received a check, the journal referred to declares, but legitimate commerce is in a fair position. We hope this may prove to be the case, and that before the east winds of a cold spring have ceased to blow British ships will bear more largely the products of British mines to many lands.

MINING IN THE EAST—No. XII.

I.—Smelting the Ores to Mattes.

Roharbeit.—In this operation the quartz combines with the iron, clay, lime, &c., to form a fluid scoria, while the sulphur seizes on the diffused semi-reduced copper—so that the great bulk of earthy matter is slagged off, and the copper concentrated into a matt composed of iron, sulphur, and copper.

The relative proportions of the various ores delivered at the smelting-works have always been very irregular, latterly about 10 parts of Brankovitz sulphides have been added to 40 parts of the different oxidised ores of Tenka. Since the deep deposit of the Tenka ferruginous ores has been fully opened no more difficulty has arisen in the mixing of the ores *vormass*. It would be of no value to give the quantities of the different ores of the fusion-beds, as the proportions sometimes vary several times in the course of a month. An average analysis of the ore has been given. To assist reduction, and ensure a sufficiently fluid scoria, a varying proportion of the slags proceeding from the copper furnace is added to the smelting mixture. It is also beneficial to mingle a small proportion of the "fines" which accumulate in the floors of the matt roasts, as it prevents the scorification of the oxidised ores, and retards the precipitation of metallic iron, which is always less or more accumulating around the creuset. As nearly the whole of the sulphur contained in the *cormass* will be retained in the mattes the richness of the latter may always be determined by the proportion of roasted sulphides added. Experience has demonstrated that with such ores as are smelted at Maidanpek, a matt of about 22 per cent. is the most advantageous, for whilst a richer matt tends to leave too high a percentage of copper in the slags, a poorer one renders unsatisfactory the fusion for black copper. It is of consequence so to regulate the temperature of the oven and the quantity of flux (copper slags) added that the scoriæ advances slowly along the slag channel, because should the scoriæ be either too viscid or too fluid a loss of copper ensues; in the latter case some copper becomes scorified, and in the former small globules of matt become entangled in the slags. A high heat must be carefully avoided, as it leads to the precipation of metallic iron.

Management of the Furnaces.—After these arrangements, which fall under the especial guidance of the master smelter have been attended to, the manipulations are conducted by two smelters each working 12 hours. Each smelter is provided with two workmen—a *hilfer* who, posted on the platform, is responsible for the proper feeding of the furnace, and a *Rohltrager*, whose duty is to bring at regular intervals the baskets of charcoal. The smelter remains on the floor and attends to the tuyeres, slag overflow, &c. In general operations, such as tapping and cleaning the furnace of infusible matter, the two workmen assist the smelter. The wages of the smelter are 2s. 2d., those of the workmen 1s. 9d. and 1s. 3d., and at the end of a campaign which has given results above the average the wages are increased according to an arranged scale. The preparation of the fusion beds costs 1s. 6d. per 24 hours.

When the shell of the furnace, which is thrown down at the end of a campaign, is rebuilt and dried, a brasque—composed of three parts of charcoal dust to one of argile, crushed together so as to be intimately intermingled—is carefully stamped into it, and the creuset and tapping-hole shaped out. A hundredweight of charcoal is then thrown in and left during several hours to dessicate the brasque. The body of the furnace is then nearly filled with charcoal, and the feeding commences with slags from the first operation until a good nose forms itself around the nozzles, and then gradually with ores mixed with scoriæ from the copper smelting. The mixture is fed against the back and sides of the furnace, and the fuel principally in the middle and against the breast. During the first two days great attention must be given to the working, and the oven must not be forced. On the third day it is in good running order, and ore may be thrown in as fast as fusion demands; should, however, the ore over a particular tuyere discontinue to sink into the furnace instant care must be taken to clear it. If the furnace is regularly worked it will continue running until the brasque is worn out and the tapping-hole reaches the bottom of it.

At the first tappings only a few hundredweights of mattes are obtained, but the gradual fusion of the brasque enlarges the capacity of the creuset. The oven is pierced twice a day at 11, which allows of some control over the night and day workmen, and run into a crucible formed of ground cupriferous quartz, from which it is removed in discs of about ½-in. thick. The ovens are now thoroughly cleared of any infusible lumps which may have accumulated, and the slag overflow set in order. The scoriæ are thrown into an iron tram-wagon which remains near the overflow, and trammed away to the tip.

The weight of mattes run varies, according to the richness of the *vormass*, from 14 to 20 cwts. When the flowing matt has a blood-red appearance it is confessedly rich, but when pale the smelter learns that the smelting of the past 12 hours has been defective. By experience the smelter recognises the percentage of his mattes, whether they be hot or cold.

The slags during the whole of 1874 were sampled every day, so as to fix with certainty the loss of copper, and the average percentage of the copper found in them amounted to 0·35, or (say) one-third of 1 per cent.

Although the advantages of this method of smelting may be considered indisputable, it is yet in some respects faulty. It has been found impossible to prevent entirely the formation of infusible agglomerations, which occasion a slight loss of copper and fuel. It is also open to the objection that carelessness on the part of the workmen leads to the precipitation of iron around the creuset, which has to be removed by the addition of pure pyrites, which, passing into the mattes, seriously lowers their percentage.

Results.—The following data give the average results of smelting during 1874:—

Average percentage of the ores, dry weight	4·50
Tons passed per campaign, exclusive of 700 tons of slags from copper furnaces, added as flux	53·00
Tons passed per campaign, dry weight	42·15
Average humidity of ores smelted, per cent.	20·45
Actual weight passed per campaign, in tons	68·66
Number of days each campaign endured	13·42
Tons of *vormass* passed per 24 hours	5·12
Tons of ore passed per 24 hours	3·96
Total tons of ore smelted, wet weight	4720
Charcoal consumed, in tons	2470
Charcoal consumed per ton of ore reduced, in tons	0·404
Average percentage of mattes run	20·15
Total number of days furnaces worked	1194
Number of campaigns made	89
Tons of charcoal burnt per 24 hours	2·07
Labour cost per 24 hours	11s. 10d.

The carelessness of the gipsy smelters shortens the average length of the campaigns, and reduces the amount passed per day. The better class of smelters run their ovens 21 days, and pass more ore per diem with the same amount of fuel. It should also be noted that the ores contain a large quantity of silica and alumina; could a larger proportion of pyritous ores be passed, and the aluminous ores rejected, nearly double the quantity might be passed. Should the ores contain arsenic, zinc, or antimony they should be slowly roasted in a reverberatory furnace before attempting to pass through a Castillian oven.

Cost of Reduction.—The average cost of reducing the ores to mattes was very high in 1875 owing to several reasons—1876 will probably show a reduction of 10 per cent. The following figures give the average cost per ton of fine copper contained in the mattes during 1875:—

	£	s.	d.
Roasting the sulphides	0	4	0
Smelting the ores to mattes	5	12	1
Rebuilding furnaces	1	9	9
Smiths' work	0	14	0
Divers	0	8	1½
Removing slags	0	4	1½
Charcoal	20	11	1
Total	£29	3	2

The ores raised in 1875 were of very low produce, scarcely averaging 4 per cent.; it is hardly necessary to add that the cost of smelting would decrease *pari passu* with the increased value of the ores, but one will get a better conception of the cost of reducing the ores by giving the actual cost of reducing a ton to the shape of mattes—this amounted in 1875 to 19s. 1½d. inclusive of all charges.

II.—Roasting the Mattes.

The discs of mattes *lech* are broken into small fragments—in which state only can they be thoroughly roasted—are weighed and barrowed off, and thrown on the bed of wood which has been previously prepared. This takes place each mid-day, and continues until the roast heap holds 20 tons. The wood is then fired by means of charcoal placed at short intervals, and in four days the first roasting is done. The mattes require to be roasted five or six times, and at the third time it is usual to mix a certain proportion of quartzose copper ores with the heaps, to facilitate the fusion for black copper. Each roasting requires five days, so that a month is necessary to prepare them for running. All the roasting is done in the open air, roasting in chambers has been tried, but the experiment proved unsuccessful. The average cost of roasting 1 ton of matt is as under:—

	£	s.	d.
22 lbs of charcoal	0	0	2½
1·12 cubic metres of wood	0	1	2
Labour and materials	0	3	6¼
Total	£0	4	10¾

On the proper roasting of the mattes depends to a great extent the quality of the copper produced. Numerous beautiful tufts of moss copper originate in the amygdaloids of the mattes, and when arsenic is present brilliant crystals of its acid are formed, and from the various combinations of arsenic and sulphur the heaps are tinged with varied shades of red and yellow.

The roastings render the mattes lighter and richer, and when a somewhat cindery mass of greyish-black fragments remain the process is complete. The elimination of sulphur should not be suffered to proceed too far, as a proportion of sulphur is necessary to form an *oberlech* to protect the copper when tapped. An analysis of the mattes shows it to contain:—

Copper	20·5	Antimony	Traces.
Sulphur	28·8	Arsenic	do.
Iron	49·2	Lead	do.
Silica	1·4		

III.—Fusion for Black Copper.

The permanent portion of the furnace used is precisely the same as that used for the first operation; but, as the weight is much greater, the body of the furnace is made stronger, especially the wall around the creuset. It has, also, similar tuyeres, but the pressure of the blast is stronger; it requires, indeed, as much blast as would suffice for three ore-ovens. The brasque is made stronger, being composed of equal measures of charcoal and argile. In commencing a campaign similar precautions must be taken to those above described, and it is equally on the third day that the furnace is in a good and secure working condition.

In addition to the quartz ores mixed with the mattes at the third roasting still more is necessary, and sometimes as much as a quarter of the *vormass* consists of it. Its use allows of a complete roasting of the mattes, as the rich copper ore it contains (30 to 35 per cent.) supplies a rich sulphide to form *oberlech*.

The tapping is made at the end of the first day, when 5 or 6 centners of copper may be run out; but on the third day 2 tons, and on each succeeding day of 24 hours 2½ tons, are produced. The furnace is tapped morning and evening, and 20 ingot moulds, of 135 lbs. capacity filled. An hour before piercing the creuset the furnace is forced, and some mattes rich in sulphur added, to increase the heat and ensure a sufficient quantity of *oberlech*.

As several heaps of roasted mattes go to a campaign it is advisable to make each *cormass* from the whole of the heaps to be passed, so as to arrive at a regular percentage of copper in all the ingots.

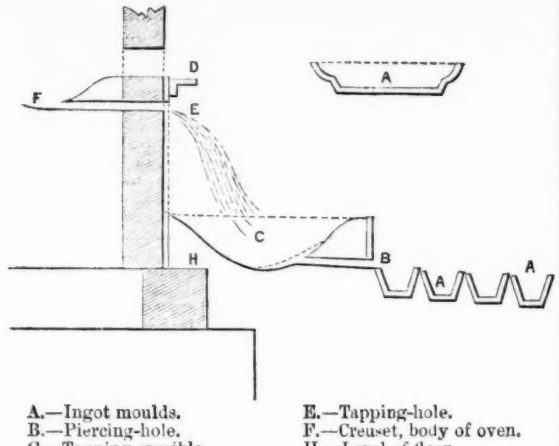
To work the fusion furnace two extra labourers are required, as double the weight both of fusion rods and of charcoal is passed. The wages of the men are increased 20 per cent., and a gratuity is also given after a successful campaign. A high and regular temperature is important, so as to avoid all danger of "freezing"—a most serious accident, as the copper would solidify around the creuset and prevent tapping, in which case a large copper "bear" would result, and the furnace be blown out. Thus, not only would the campaign be arrested, but there would be the trouble of extracting and cutting up an unwieldly mass of metal, and of re-smelting the same—both expensive operations. Such a casualty need never be feared with good workmen when care has been paid to the brasquing and building, but at Maidanpek, through the culpable carelessness of the gipsy smelters, it happens once or twice a-year. When the nozzles are kept free, and the feed is intermittent, the weight passed per day reaches 10 tons of mattes and quartz.

The whole of the scoriæ proceeding from this fusion is added to the ores as a flux—great care is not on this account taken to clear them of copper; but, although these scoriæ contain generally from 1½ to 2½ per cent. of copper, the loss need not be more that one-half of 1 per cent. should the slags be not required. This scoriæ is a sub-silicate. During the last two years lignite has been used in preference to charcoal, and has resulted in a better description of ingots, as the copper can be run much hotter.

The copper is run into the brasque crucible made before the breast, and should it be intended to rosette the copper it is removed in thin discs, about ½ in. in thickness, and it gradually cools. Water

may be thrown on it to assist the cooling. If intended to be sold as black copper or refined in the *spleissofen* it may be run into ingots.

MAKING COPPER BARS.—If it is proposed to run ingots the crucible in front of the breast-plate must be provided with a piercing-hole, leading from the bottom of it to the row of ingot moulds, which are usually made of cast-iron, though there is little doubt but that copper ones would be more serviceable and cheaper. The following sketch explains the arrangement:—



A.—Ingot moulds.
B.—Piercing-hole.
C.—Tapping crucible.
D.—Slag overflow.
E.—Tapping-hole.
F.—Creuset, body of oven.
H.—Level of floor.

The ingot-moulds, 2 ft. long, and about 9 in. across the top externally, are laid side by side quite level, and in order to confine the fiery torrent of copper and rich matt as it cascades from one mould to another a bank of brasque is raised on each side. The pathway of moulds slopes at an angle of 12° at the beginning, the rate of inclination continually increasing to the depression at the end, made to confine the *oberlech*, which usually contains half its weight in copper. From 15 to 20 cwts. of this rich matt are made daily, and this is roasted and mixed with the *lech* or crude mattes for the succeeding campaign. As there are from 20 to 24 moulds to fill there is often a difficulty in keeping the copper at a temperature sufficiently elevated to run freely the whole length. To ensure this it is necessary to tap all the copper into the crucible, C, and pole it with branches. When full the layer of brasque, which has been prepared of just sufficient strength to bear the weight of copper, is at a given signal pierced with a long wooden pole, and the torrent of copper and *oberlech*, with a small quantity of scoriæ, sweeps down over the moulds, filling them successively. Should it towards the end progress slowly it may be assisted by wooden scrapers.

The ingots are kept quiet and bright on the top by the layer of rich matt, which protects it from the atmosphere. The usual depression is very marked. After a few minutes, to permit the copper to set, water is thrown over the ingots, which are more easily freed from the adhering matt when warm. The thin plates of copper between the ingots are then broken off, and with a little cleaning the ingots are ready for sale.

RESULTS.—During 1875 there were 10 campaigns made, producing 124 tons of black copper from 743 tons of mattes mixed with 161 tons of cupriferous roasted quartz. The average weight passed per day was 8·10 tons, requiring 65 cwts. of charcoal and lignite to fuse them. The labour cost was 16s. 2d. per 24 hours. The average cost of running 1 ton of the *vormass* amounted to 9s. 4½d.

COST PER TON OF COPPER.

Smelting the mattes	£0	19	4
Reinstating furnaces	0	3	4
Smiths' work	0	2	3½
Charcoal and lignite	2	1	1
Divers	0	9	11
Total	£3	15	11½

The copper ingots produced are sold as Chili bars to the refiners, and, from its being of excellent quality and easily refined, commands a preference in the market. The following is an analysis of the last group sold; usually the copper contains only traces of arsenic and antimony, and but a small percentage of sulphur, the impurity being iron:—

Copper	93·88	Arsenic	0·40
Iron	3·70	Antimony	0·30
Sulphur	1·50		
Lead	0·22	Total	100·00

[*To be concluded in next week's Journal.*]

SOUTH AUSTRALIA.

SIR,—When the English copper market is dull mining generally in South Australia is not very lively. Of course, the old established and productive mines—like the Moonta, the Wallaroo, the Hamley, the Kurilla, the Devon Consols, &c.—continue working, and these mines are doing well. A few others, also, are showing encouraging prospects, but as long as the price of copper is low there seems to be a want of spirit in connection with mining affairs. I am happy to say the Burra Mine, as the sinking is carried down, continues to improve, and the works are to be pushed forward with increased vigour. Contracts have been let for sinking the main engine-shaft to the 160 fm. level, and for carrying on other important work in the mine. Some very good ore is being raised, and the nature of the ground, as shown by a change in the rock, is such as to lead to the expectation of better results when a lower depth is reached. Should the Burra Mine turn out rich, or even payable in depth, as there seems every reason to hope it will do, there will be great encouragement for carrying on many mines in the North of this colony when the railway from Port Augusta to the "Government Gums" is commenced. There are several mines in the Far North where but little work has been done, and others—like the Blinman and Yudanamutana, Mount Rose, and Prince Alfred—where the workings were more extensive, but yet where they have been suspended or abandoned. Mines like these would undoubtedly be thought more worthy of a further trial if the Burra showed any considerable improvement at the 100 fm. level, as it seems very likely to do. It is to be hoped that the commencement of the Port Augusta Railway will not be much longer delayed—so many important interests are concerned in the completion of this great work. It will afford a grand field for the investment of capital in legitimate mining operations.

Although mining is dull, I am happy to say occasional discoveries are still being made. I was last week shown some splendid samples of silver and copper ores obtained from three different localities about 15 or 20 miles eastward from Kapunda. The recent discovery in the old Bremer Mine, at Callington, is turning out very well. It was curious, and must have been rather annoying to the former proprietors, that after the old mine was "knacked" and sold a really rich lode should be discovered on the property within 300 yards of the main shaft. The ore is grey oxide, of 45 to 50 per cent. copper, and the lode is 4 ft. wide solid.

A new gold field has also been opened within the month, about two miles nearer Adelaide than the old Echunga diggings, and only 17 miles from the city. The country all around is more or less auriferous, and the diggings are in close proximity to the Onkaparinga river. Some very good returns have been obtained, and as 200 or more men are now at work the flat is likely to be tested. Several holes have been sunk without yielding gold, but the sinking is easy, and the "bottom" is reached at various depths—from 15 to 25 ft. It seems likely that the locality of the diggings was formerly the bed of the river, as it is quite an alluvial flat, very little raised above the summer level of the stream. I may mention that three or four of the first parties who set to work here are believed to have averaged 1*l.* per man per day. One pare of men (two men) during three days (not consecutive) washed out 3 ozs., 4 ozs., and 4½ ozs. respectively, and on the other days they made very good work. The gold is solid and nuggetty—indeed, several small nuggets have been found, varying from ¼ oz. to 1¼ oz. in weight. The bed of the river for miles has been proved to be auriferous. The gold reef at Wankaringa, which has before been mentioned in the Journal, continues to yield rich stone, but requires more energetic working. When more energy and perseverance are displayed in gold mining I believe it will become a more profitable pursuit in South Australia than it has yet done.—*Adelaide, March* 24. RESIDENT.

GREAT EXCITEMENT IN THE SOUTH OF CHILE.

RECENT DISCOVERY OF GOLD FIELDS.

SIR,—Most of the Chilian newspapers are busy about the recent discovery of new gold fields in the South, near a place called Canete. Several official communications have been forwarded to the Minister of the Interior. I send you an original from the Valparaiso newspaper, the Mercurio, which will be forwarded to you with the translation. The trials, in the presence of the Governor of Canete, or of that province, are more than satisfactory; the calculation is that the pan gives about 20 cents of gold; the batea and pan are about the same size. In California, when a cubic yard of earth gives from 15 to 20 cents in gold it is considered a very good thing. Therefore, how much richer these recently-discovered gold fields must be when a batea contains about 1-60th part of a cubic yard of earth.

I am convinced the more I travel in Chile that some day this country is destined to follow in the footsteps of California and Australia. No hydraulic washing like that of California has ever been attempted in Chile; nothing but hand labour and the pan. Chile has great advantages over California and Australia—the wages of a mine labourer are about 2s. per day, and that of an experienced working miner about 4s.; in California the same man gets $4 per day. Provisions are cheap. In California gold digging was commenced under most unfavourable circumstances. Everything was sold for almost its weight in gold. Somebody has only to commence gold digging on a large scale in Chile and it will be followed by a rush to this country. Almost all the gold fields of Chile have an accessibility that few countries possess; they are either close to the coast, or near some railway. HENRY SEWELL, M.E., F.R.G.S.

Valparaiso, Chile, March 15.

RECENTLY-DISCOVERED GOLD FIELDS NEAR CANETE, CHILE.

The Governor of Canete has addressed the following letter to the Prefect of the district:—

SIR,—Desirous of knowing the value of the newly-discovered gold fields in the mountainous district of Nahuelbuta, near this town, I proceeded to these mountains, stopping there two days with the intention of examining the ground, and of judging for myself the importance of this discovery. On my arrival there I found Mr. Crosby, the United States Consul residing at Talcahuano; this gentleman has at present several Chilian workmen in his employ, and two experienced miners from California. So far Mr. Crosby has only commenced operations in one or two spots, until he receives from his partners, Messrs. Ruiz Tagle, Echararria, and others by the following mail all the necessary appliances for conducting them on a larger scale.

Having informed MR. Crosby that the object of my visit was to obtain for the Government all the information possible as to the value and extent of this new discovery, he immediately proceeded to help me in the kindest way to attain this end. He ordered several workmen to accompany me and make trials in my presence wherever the ground presented a good appearance; and having washed the contents of four bateas or pans, collected by the workmen in different places, these produced grains of gold, valued by those present at from 60 to 70 centavas, or about 20 cents of gold. Mr. Crosby and his partners assure me that a man washing with the tedious system of the batea (pan) can with ease obtain $2 per diem, and that this could be quadrupled by adopting the Californian process of washing, which it is intended to do very shortly. The extent of ground for gold washing in these mountains is so great that there is ample room for many other large companies.

Canete, Feb. 15. BENJAMIN ORTIZ FERNANDEZ,
Governor of Canete.

MINING IN COLORADO.

SIR,—Having spent some seven years on the plains of Kansas and on the mountains of Colorado, I returned two years ago last February to England, my native country. While there I entered the Royal School of Mines, in Jermyn-street, and studied during one session the assay of gold, silver, and lead ores, with the intention of making this country my next sojourning point. I arrived here four weeks ago, and since that have employed my time in visiting the mines and their owners. In this work I have been aided and accompanied by an old friend of mine (also a Britisher) who has been living here for a year, and through whose representations I was mainly induced to come. I am now fully satisfied that this is the greatest silver district in the world, though as yet undeveloped, but the rapid approach of railways and construction of toll roads will very soon make it known in the mining world. Knowing how my countrymen have been swindled in some American mines, and seeing the extraordinary chances there are here for the advantageous investment of capital, I fear lest some swindle may be perpetrated in England which will effectually ruin the reputation of this country, so wonderfully rich in gold, silver, and lead.

I write, therefore, to say that if any mining property from this district is offered for sale in England, or if any wish to know aught of this country, I will gladly afford such information as may be required of me *free of charge*. I have no "axe to grind," but expecting to make this place my home for five years at least, am anxious that it should not be misrepresented in England. I expect in the course of three weeks or so to be engaged in the work of building a toll-road into the Animas silver district, and that fact, combined with my long residence in the Far West, has brought me in contact with the best people, and rendered me (I think I may say without egotism) fully competent to furnish the information I now volunteer. I enclose my references in London, and think that by publishing this letter you may, perhaps, confer a benefit to some of your many readers.

I may add, that I shall take every opportunity I may have to forward communications on mining matters for publication in the columns of the *Mining Journal*. W. WESTON.

Del Norte, Rio Grande Co., Colorado, April 12.

THE LAST OF THE EMMA MINE.

SIR,—There are some who appear to congratulate themselves that as the result of the New York trial has proved that there was no fraud in the transfer of the now celebrated Emma Mine to the English company we have probably heard the last of the mine. In this they will most assuredly be mistaken, and I feel convinced that the mortification of the shareholders, both original allottees and others, will within the next few years be even greater than it has been hitherto, as they will find that worked as it will be by Americans it will yield such profits as would have sufficed to pay a fair dividend upon the entire 1,000,000*l.* paid for it. It is probable that the now oft-repeated complaints that the Emma is "a gigantic swindle," that the vendors were rogues and schemers, and that Yankee verdicts must always be looked upon with suspicion will be withdrawn, or at least replaced by a complaint of the stupidity of those who sought to earn dividends by litigation and the gratification of personal animosity, instead of by legitimate mining. Too much may have been paid for the mine, and the English adventurers may have been unfortunate in working it so as to produce a cave in, but the price to be paid was known to the purchasers before they parted with their money. The uncertainty of mining (compensated, however, by the fabulously large prizes often obtained) is known to everyone, and we have the well-known commercial maxims that we must make the best of a bad bargain, and must endeavour to remedy misfortune when we unluckily encounter it.

Investors are too prone to condemn all mines as gigantic swindles until the return of regular profits of 50, 60, or 100 per cent. produces a more charitable opinion, and hence it is not many years ago that the Cape Copper Company was condemned by a certain class as a failure, and the remark was very freely made that Messrs. Taylors were lucky enough at home mining, but always unfortunate with their foreign concerns. The Cape Copper has now returned the capital within a few shillings of four times over, and is now paying 40 or 50 per cent. per annum dividend, and the Fortuna, Linares, Pontgibaud, and Alamillos are paying regular and large dividends, and all have about returned the capital expended on them, one having done so more than five times over. But if every mine that does not pay dividends is to be regarded as a gigantic swindle, why should any of the non-dividend foreign mines at present quoted be regarded as marketable? Surely no one buys into a swindle with an idea of participating in the proceeds thereof. Take all the American mines quoted last week, and see whether there is one more promising than is the Emma, even at the present moment. I include both North and South American non-dividend concerns, which will embrace Argentine, Blue Tent, Chontales, Condes, Exchequer, I.X.L., Javali, Malabar, Malpaso, New Quebrada, Oregon, Rica, Rossa Grande, San Pedro, Tecoma, and United Mexican, and there is not one of them which has as good a prospect of paying 5 per cent. per annum upon their respective capitals as has the Emma of doing so upon the gigantic capital of 1,000,000*l.* It has often been remarked that a miner who is not sanguine is unworthy of the name, and this is absolutely true, but it must also be said that one entering upon mining enterprise without ascertaining fully the value of the property does far more injury to legitimate mining than he does to his own pocket. There is an abundance of mines which will pay the capitalist well, but the profit can only be obtained by working them fairly and with ordinary patience. And it cannot be too distinctly urged that the business of share jobbing and fair mining cannot be carried on together, and that it is unreasonable for those who fail in the former to lay the blame upon the latter. Let the Emma be a warning to investors, but let them not regard the loss they have incurred as a loss incurred by mining.—*May* 9. FAIRNESS.

ON COMPRESSED AIR, AND ITS UTILITY FOR MINE

SIR.—Compressed air has been used now for some time as a motive power for machines for drilling rock, cutting coal, underground hauling, and pumping water, also for the temporary ventilation of stone drifts and headings. Though it may not have been found an economical power for these purposes in collieries, yet when we consider the advantages of a main line of pipes and branches from it, conveying air highly compressed into the working parts of a mine, the advantages it affords for utilising this power at any point on the system of pipes for all the purposes named above, we must confess that there is an adaptation to the circumstances which no other power possesses, especially when it is considered that the exhaust air has a beneficial effect in ventilating and cooling the places where this power is being used. The system of pipes may be also utilised for other purposes than conveying air, if required, as in the case of an underground fire, water could be conveyed in the pipes for its extinction, so that the system of pipes is in it-elf an advantage in the main roads of a mine for conveying compressed air (more particularly) or water. My impression is that in the future we shall have new collieries laid out with a view to using compressed air for all mechanical operations in the mine, such as hauling, cutting coal, and pumping water, the workings of the mine being limited in their area as far as possible.

When a steam-engine is placed at the bottom of a pit its operations are usually limited to hauling coal and pumping water; it might however—if of sufficient power—work also an air compressor for other requirements of a mine. It will be found, however, more convenient—though entailing a complication of machinery—to have a steam-engine and air compressor at the top or the bottom of a pit, by which other machines in any part of a mine may be driven by this power. This is apparently a question whether steam or compressed air should be used as a motive power in mines; by the latter, supposing the workings are pretty well concentrated in area, all the operations of cutting coal, rock drilling, hauling, pumping water, and assisted ventilation in the working faces will be effected at the various points at which they may be required, merely by a connection with the system of pipes conveying the compressed air.

After these general considerations some details of the system of compressing air may be added. In most cases in the country the air compressor is placed behind the steam cylinder, the piston of each being attached to the same piston-rod. This arrangement, however, would not work well where much expansion is carried out in the steam cylinder, because the steam at the commencement of the stroke would be at its greatest pressure, and the air in the compressor at the least. At the end of the stroke the reverse of this would take place; the steam would be at its lowest pressure, and the air in the compressor at the highest. If little or no expansion is used, and a fly-wheel is added to the engine, then this arrangement may safely be adopted. Where expansion in the steam cylinder is adopted the compressor should be placed by the side of it, each being connected by a crank to the main shaft, having a fly wheel added, the cranks being set at a proper angle, so as to equalise the power and effect. When air is compressed heat is produced according to pressure. The body of the air cylinder, which is jacketted, is kept cool by a stream of water passing through it. The ends of the cylinder should be protected in the same manner. From the compressor the air passes to a receiver, which should be provided with a waste-cock to let off moisture, safety-valve, pressure gauge, thermometer, and a valve of communication with the mine. The descending pipes in the pit are usually wrought-iron. At the bottom of the pit another receiver should be placed, having the same appliances fitted to it as the first, for getting rid of moisture and indicating pressure and temperature. As the compressed air rapidly loses the heat engendered in its compression, it will be found that at receiver No. 2 the tension arising from heat has almost disappeared in its passage from the first receiver and the pipes between them.

The steam-engine at the top of the pit performs two duties—it compresses from the atmospheric to a pressure required, and forces this compressed air through the receivers and pipes to the machine, where it is utilised. Attempts have been made to use air pressed to eight atmospheres, but this is attended with great inconvenience, as the exhaust at the machine at these high pressures forms ice, obstructing its working unless the cylinder be heated. Accordingly pressures of three or more atmospheres are commonly used.

The amount of effective work obtained from compressed air in proportion to the force in creating it has been stated to be from 30 to 35 per cent., but this relation of power to effect must obviously vary much—first, from perfection or imperfection in the machinery, that is, in the steam-engine, compressor, and the engine in the mine; secondly, the length of pipes between the two former and the latter will give frictional resistance directly as their length. With a velocity of 2 ft. a second and one of 6 ft. per second in the same pipes, the resistance in the latter case will be nine times that of the former, and high pressures will give proportionately greater resistances than low pressures. It is obviously important—in order to obtain better results from compressed air than the low percentage usually ascribed to it—that the pipes should be of ample area, the ports for the admission and discharge of the air larger than those for steam in the proportion of five to two, and the working machinery should be as perfect as possible.

Air-compressors are in operation in the Newcastle coal district, also in Lancashire, Yorkshire, and in South Wales, most of these being erected with the object of driving coal-cutters. The most complete air-compressors and machinery for a mine is no doubt that erected at Ryhope Colliery a few years ago, as a motive power for hauling-engines underground. The steam-engines are placed at the top of the pit, two cylinders 33 in. diameter each, two air-cylinders 32 in. diameter, all of 5-ft. stroke, the compressors are placed behind the steam-cylinders, the pistons are attached to the same rod, in front of the steam-cylinders connecting rods work to a cranked shaft, on which is the fly-wheel 22 ft. diameter, 14 tons weight. The air-cylinders are jacketed, and a circulation of water is maintained through the annular spaces, the inlet and outlet valves are 8 in. diameter. The receiver at the pit top is 30 ft. by 6 ft. diameter ⅜ in. thick, two safety-valves pressed at 40 lbs. The receiver at the bottom of the pit is 500 yards from the first, 12 ft. by 4 ft. diameter, ⅜ in. thick, one 3 in. safety-valve, pressed to 50 lbs. The pipes between the receivers are of wrought-iron 9 inches diameter, ⅜ inch thick. Between this and the hauling-engines two more receivers are placed similar in size to the last; No. 1 hauling-engine being about 1500 yards distant from the air-compressors. Cast-iron pipes are used for conveying air to the hauling-engine, principally 6 in. in diameter. The hauling-engine has two 14-in. horizontal cylinders, 18 in. stroke, geared in the ratio of 1 to 2¼, with main and tail rope

drums 4 ft. and 4 ft. 6 in. diameter respectively. A train of 30 tubs is hauled each way, outwards at the rate of 6½ miles per hour with a load of 27 tons of coal. Another hauling-engine similar in size to this has been placed in the mine; the compressors are of sufficient power to drive three of such engines.

The writer described, in the Journal of August 14, 1869, the air-compressors and hauling-engines then in use at the Middle Duffryn pit, near Aberdare. The compressors were originally intended to work coal-cutters, but the use of these having been given up, the compressors were utilised for driving hauling-engines in the mine. The machinery consisted of two 21 in. steam cylinders, 2-ft. stroke, two 28 in. compressors, 4-ft. stroke, geared in the ratio of 1 to 3; these are placed at the top of the pit, pressure 45 lbs. at the receiver, one receiver at top, another at the bottom of the pit. Four hauling-engines are placed at various quarters in the mine, two of them have two 9-in. cylinders each, placed at 200 yards and 400 yards north of the pit respectively; two other hauling-engines have two 6-in. cylinders each, one being placed 1000 yards west of the pit, the other 1400 yards north-west of the pit. These engines could be readily removed to any quarter of the mine. M. E.

COMPRESSION VERSUS EXPANSION.

SIR,—I see from the Supplement to the Journal of May 5 that Mr. C. Colwell is again raising his voice in the advocacy of the ventilation of collieries by the forcing of air into them. The next letter, by "Engineer," advocates a system of laying out mines on the dual plan. It has rather amused me to find that the suggestions of the two letters if put into one would form a plan nearly identical with one I suggested in a letter in the Journal some time ago. This seems to me a matter well worthy of the serious consideration of mining engineers. My plan, briefly re-stated, is to have each colliery having two distinct systems of ventilation wrought alternately on the expansion and compression method, men always being at work where the air is being compressed. The variation of pressure against a wall of coal, owing to the oscillation of atmospheric density, would be great, the chances of the outbursts of gas or water taking place during the period of expansion would reduce the danger during the hours of compression, and work to the verge of safety. Will some practical man kindly state what objections there are to the working of such a plan? DAVID BURNS.

Alston, May 8.

MR. MACDONALD'S COMPENSATION BILL.

SIR,—This is a Manager's Question, and it seems to me that they should be stirring themselves. The burden of the employers' song is—"Take anybody you like, but don't take me." Now, whether a manager is a fellow-labourer or not, it is a very serious matter, for no doubt he is civilly liable, and must pay if he has means. If Mr. Macdonald's Bill were law to-morrow, then, in the event of a coal-master being called upon to pay (say) 1000*l.* compensation for damages caused by his manager's neglect, if the manager had the means of paying this sum, and the owner had a mind to sue for it, no doubt he could make him.

I have before me a case where a workman sued his employers for damages for an accident which his son had received through the manager's carelessness. The workman spent a hundred pounds of his own money in raising his claim. One Judge awarded damages, but the higher Court reversed the decision, indicating that he had a good case against the manager. Ultimately the owner's agents gave the man a small sum to give up his claim against the manager, but what if the owner had not done this, or what if the owner takes it into his head to make his manager pay this sum?

How can we expect to get good managers or saving managers with the knowledge that some fine morning all their savings will be sweptaway? Such a thing should be put beyond a doubt. The owner should boldly take upon himself the responsibility of his manager's failures. If the manager is liable to be prosecuted for costs, and costs awarded, the owner should pay them.

AN ENGINEER.

COAL AND IRON NEAR INVERNESS.

SIR,—Allow me again through the Journal to direct attention to the undeniable fact of the existence of coal and ironstone on several properties in the vicinity of Inverness. That ironstone exists on the properties of Culloden, Llanach Leys, Inobes, Daltullich, and others, is assured by the numerous wells whose waters are of a strong ferruginous nature, which exist upon them. Then coal actually crops out at a place called Prolowdie, on the lands of Llanach, the property of Mr. Duncan Forbes, at the water edge of the River Nairn. It is, besides, known to exist in Leys, and in Collartoun, of Daltullich, tenanted by Mr. Duncan McBean, it is to be found at no great distance beneath the surface. With these facts staring the proprietors and the public in the face, is it not extraordinary (almost incredible) that no attempt has ever been made to ascertain the extent or quality of the ironstone or coal? Yet true it is, although every clodhopper in the locality knows of their existence. This is a sad satire on the proprietors, but want of energy and enterprise characterise their minds, and want of capital their pockets. These must come from elsewhere, otherwise the untold mineral treasures of this northern locality may lie concealed till doomsday. MINERALOGIST.

Inverness, May 9.

ROCK DRILLS.

SIR,—Your correspondent "M. E.," in the Journal of the 5th inst., endeavours to institute a comparison between the results of two totally different schemes and systems of level driving. In the case of Sir Francis Level he was in possession of all the necessary data, but in the case of the St. Gothard Tunnel he was in possession of no single datum except the speed attained. It is not, therefore, surprising that his comparison should be a failure, and that it throws no light whatever upon the subject in discussion.

In the St. Gothard Tunnel speed was everything and expense nothing. In my level expense was everything and speed of secondary importance. If I could drive twice as fast with the machine at the estimated hand labour price per fathom, which at the time the contract was taken was 8*l.* 10s., I should clear my expenses, and the interest of the capital outlay at starting. If not I should be a loser. There was no premium upon speed, and no fine upon failure. In the St. Gothard Tunnel there was a large and increasing premium upon speed, and a heavy fine in the event of the Tunnel not being completed within a given time, and it is this heavy fine which is likely to smash up poor Mons. Favre in spite of the wonders he has accomplished.

Surely it is evident that if one man is working, regardless of cost, three shifts in the 24 hours, and the other is tied down to a fixed price per fathom, and that he can only keep within that fixed price by working one boring shift instead of three, he is tethered at both ends. Extra speed means nothing but extra cost: given the money, the speed follows. If I had worked the 24 hours all round I could, of course, have driven the distance in one-half if not in one-third of the time, but I could not have done it for the same money. The assertion that if done in less time it would have cost less money is simply ridiculous, it would have cost far more. The saving of interest in the saving of time would have been little in comparison with the extra cost. If any man thinks he can get men to do the same amount of work for the same price when they have to tramp in the night two miles from their homes over a rough moor he had better try it. I have challenged all the world to show the same amount of work done in the same time and for the same money, and wait for a reply.

The Mont Cenis and St. Gothard Tunnels are wonderful works, but who will tell us the cost per cubic fathom? The world will never get an answer to this question. But to us miners the cost is the only thing we want to know. Mineowners would no doubt like to have half-a-dozen levels going through their mountains at the speed of St. Gothard Tunnel, but where is the money to come from?

Level driving by machinery has one disadvantage which patentees and contractors in general do not care to touch upon, and that is that "speed" means too often the throwing overboard sound mining principles. The stuff has to be dragged out by three times as much boring and three times as much dynamite as there is any occasion for. That is the way a deal of the money goes, and it is a dead loss. In very hard ground the borer is the best horse in the team if judiciously used, but it cannot be advantageously used in all places and at all times, and ought always to be in the hands of the best miners that can be got, and worked on mining principles, not on engineering. The borer is a valuable adjunct, but will never supersede the miner.

I conclude as I began, by stating that no comparison can be instituted between such a gigantic work as the St. Gothard Tunnel and my poor little affair, although I venture to hope that my experience may be of some benefit both to lessors and lessees of mines.

GEO. WM. DENYS.

THE WAR, FOOD, TRADE, AND MINING.

Sir,—Russia and Asia—no conceivable position which Russia can acquire in Turkey in Asia could prove so dangerous to India as the one she already holds upon the Caspian, yet Englishmen and Anglo-Indians sleep peaceably, and are mainly interested in accumulating profits or securing promotion. They know that Russia with all her position cannot approach the Gulf without fighting Great Britain under the exact circumstances which a British Von Moltke would choose—namely, on a shore where England and India could both put out their extreme strength without being hampered by geographical difficulties; a shore where the resources of both countries could be transported by sea with as little difficulty as British troops could be transported to the Norwegian coast. Suppose the rumours of the day literally true in their widest sense, and Russia mistress of Kars, and Erzeroum, and Bayezid, still she is no nearer India than she always was, and has no additional power of compelling the Government of Calcutta to waste its resources upon precautionary armaments. Russia remains as before the only power that risks extinction by attacking the British Empire in India by a long and inordinately dangerous land march. During the first quarter of the current year the number of births was 298,435, and of deaths 182,489 showing an increase of population throughout the United Kingdom of 115,946 souls. The estimated inhabitants at the end of the current quarter (June 30) is 33,444,412, of which England and Wales contribute 24,547,309, Scotland 3,560,715, and Ireland at 5,336,395. The registered number of persons married for the quarter ending December last was 146,260. From a parliamentary paper recently issued the number of persons employed in the public offices and departments increased 933 in number, and in salaries 174,628*l.* On the other hand, the reductions were 61 in number, and 36,140*l.* in salaries and expenses. Many endeavour to teach us, at least by inference, that our country is over populated, and that this over population is the chief cause of the wide-spread distress that prevails. We hesitate not to say that more mischievous fallacies were never propounded by philosophers, or accepted by their disciples. The converse of this is the real fact. The true wealth of a nation consists in the abundance of its healthy and virtuous inhabitants, able and willing to do their share of the nation's work—all modern political economy to the contrary. It is possible that a country may become over populated, but this has never yet happened in the history of nations, it certainly is not our case yet. But even were there a tendency in this direction, emigration would under a proper state of things, provide an adjustment by attracting men away, with the promise or hope of great prizes in new lands, rather than by driving them out by destitution and suffering at home.

Virtuous manhood, not material wealth, constitutes the true riches of a nation, and if this be so it is difficult to conceive how mankind can be multiplied to superabundance. Were truth duly impressed on our minds, we should not go so far astray in our social problems as we do, and we should hear no more of those who would restrict the growth of population, in spite of the instincts of Nature and the voice of God, both in Providence and Revelation. As for our own country, there is work to be done in England—remunerative work, and plenty of it, and moreover there are active brains, clever heads, and strong hands to do it. Then why is it not done? Why is it that our skilled artizans are leaving the lands of their forefathers, as it is said rats leave a doomed and sinking ship? We must never forget of emigration that it has hitherto drafted off only the most able and enterprising of our inhabitants, for the most part the best of our young men. As a rule it take off none of our criminals, no paupers, no sick, no infirm, no lunatics, no drunkards, and no lazy good for nothings, but leaving those behind, materially lowers the average standard of our national character. It is not that God has failed to give unto the earth its increase, nor that he has failed to accumulate in the vast storehouse of Nature abundance for us all, but it is rather that—

"Man's inhumanity to man
Makes countless thousands mourn."

The raging war of Russia with Turkey, and the just and honourable defiance of their country against the invasion of the bear of the North by the Turks will do more material injury in the destruction of vigorous manhood, than both countries can recover during the coming two ages. The closing of the granaries of Russia will hurt the Muscovite far more than the English mechanic or labourer. For the year 1876 the imports from Russia was less than one-fifth of the supply from abroad. The excessive imports of over 7,000,000 cwts. of breadstuff in 1875 was easily obtained, although Russia only supplied a seventh part. Hence we may reasonably calculate that England will be able to dispense with Russian corn without necessitating an extraordinary rise in the price of bread. Last week the average price of wheat was 55s. 10d., in the corresponding week of 1873 it was 54s. 11d., and in 1874 it was up to 62s. 1d. This week, however, prices have again advanced, through excited speculation, at a prodigious rate. On the 1st instant the prices from country markets showed an upward movement of 10s. per quarter, and a general indisposition to sell. While the British speculator in the people's loaf is sending up the prices here the Yankee speculator is hastening to send all his corn over to the brisk market thus happily created for him. The other day the sales of corn in the Baltimore market amounted to 900,000 bushels, being 200,000 more than the largest sale ever effected in that market. Let the English gambler in corn bear this fact in mind, and thanks to Free Trade the war loaf can never again be sustained for any length of time at famine prices. There is corn in Egypt, aye, and in Australia and America too, thence let the public not be frightened at the combinations of factors; though corn is temporarily flying up, a collapse is certain to follow.

We find from a parliamentary return that we imported during the year 1876 19,267,000 lbs. of meat from North and South America and various European states, and from Belgium and other foreign countries 2,712,000 lbs. of pork, while mutton was imported to the extent of 10,304,000 lbs., chiefly from Australia and the United States. During the current year the imports of dead meat have greatly increased. For the year 1876 the gross quantity was 32,280,000 lbs., and the money value was 819,000*l.*—slightly over 6d. per lb. all round, the difference between the imports and retail prices gravitating into the pockets of merchants and salesmen. The average prices in New York during the year 1876 were for beef 5d. per lb., mutton 2½d., and pork 4½d. per lb. Beef in Canada was far cheaper, ranging from 1¾d. up to 4d. per lb. The costs of conveyance from Canada and America to England average ¾d. per lb.

The minimum value of money is advanced to 3 per cent., and will, unquestionably, advance to 5 per cent. ere Midsummer next. Trade is also on the upward movement, and after the first brush of excitement is over, and the public estimate correctly the importance of the war between Russia and Turkey, with its probable import to Austria, Germany, Italy, and France, coupled with their contensions as affecting England and India, we shall find that, come what may, Russia will never occupy Asia, Egypt, the Bay of Marmora, or the Straits of the Bosphorus and the Dardanelles. India may rest content, and Englishmen may rest satisfied that the present Government will never embroil us in war unless the interests of the nation demand it, and we acquire material and political value for the waste of life and money involved. Already the iron trade has improved, and coal will be required in increased volume as to bulk and prices. Lead is also very firm, at enhanced quotations, while copper will, probly, advance, and the consumption increase. Trade generally will expand, and the commerce of the country augment as the value of money increases and becomes remunerative.

In mining enterprise there is a decided tone, and strength of confidence engendered through the continued prosperity, of large quarterly dividends, and of fresh discoveries of hidden wealth in the subterranean mineral chambers which so conspicuously abound in this favoured island. The discoveries made at Mellanear, Van Consols, Peevor, Cathedral, South Crofty, Agar, Penstruthal, and the enhanced prospects so pointedly exhibited at Glyn and Monydd Gorddu, attest the future of mining, and show that the mineral resources of the country are all but inexhaustible. Among the formost properties are to be enumerated the South Caradon, West Tolgus, South Carn Brea, Van, Grogwinion, Great Laxey, Minera, Dyliffe, Roman Gravels, Tankerville, Snailbeach, and Leadhills. These are all great, permanent, and dividend mines, though there is a wide difference between the merits and expansive promise of each, and which practical experience can alone detect, and guide investors, too, in their choice of properties for investment. Investors should look to the future rather than the past, it is important to learn the number of points yet to be realised—the pioneer points really being prosecuted—there importance, promise, cost in time and money, and the facilities of extracting the ores when laid open; length of lease, the royalties, standing charges, and the value of ores in reserve, coupled with the yield of existing forebreasts in course of drivage on the lode or lodes already opened upon and being wrought, and whenever more ores are being extracted than those being discovered the mine is lessening in intrinsic value in proportion to the excess of minerals brought to market over those added to the reserves in store. These are desiderata that should be remembered by all intending investors, and every mining engineer should be prepared to supply the necessary data and intelligence. R. TREDINNICK,

81, *Bishopsgate-street, May* 10. Consulting Mining Engineer.

MINING PROSPECTS IN THE GWENNAP DISTRICT.

SIR,—The discovery of a copper mine of value is always a boon to the public, and it is not often we hear of such as has of late been made in the Wheal Comfort, situate between Tresavean and Penstruthal, in the centre of, perhaps, the richest piece of mineral ground in England. In Tresavean, on a discovery, the shares rose rapidly from 32*l.* 10s. paid to 2700*l.* each, and Trethellan, adjoining it to the west, from 20*l.* paid to 300*l.* each. In Wheal Comfort, which adjoins those famous mines, the outlay has been about 1*l.* 5s. per share, and likely to be in request in less than three months at ten times that amount, the course of ore in the adit level (60 fms. from surface) being a sufficient justification for such prediction; indeed, the ore already laid open, and the important discoveries continued to be made, may be said to ensure for the company equal success to that of their fortunate neighbours. It is divided into 2635 shares, and has a length of about half a mile on the course of the newly-discovered lode. The ore resembles very much what is found on the top of great deposits of copper, and it is, moreover, an important fact that it is embedded in precisely the same granite formation as the neighbouring mines that once figured (within the present century) among the greatest and richest in Cornwall. Wheal Comfort will undoubtedly be one of the rich prizes of 1877.—*St. Day, Scorrier, May* 10. CHAS. BAWDEN.

LADYWELL, AND ITS MANAGEMENT.

SIR,—In my small experience of mining adventure I have met with nothing more disappointing and irritating than this. Here was a mine—one of the really sound ones—that was going to beat Tankerville and equal Roman Gravels, and now, after going on something like six years, we seem no nearer success than at first. But the irritating part of the matter is that while all authorities agree as to the real intrinsic value of the mine nothing seems to be done. New capital is subscribed, shares to the value of 8000*l.* are taken up, and an immediately vigorous development is talked of. The mountains are in labour, and the result is those eternal 16 and 32 fathom levels with their very varying results and their monthly yield of "20 tons." The first instalment of the subscription on the new shares—2000*l.*—has been paid up, as I understand, but the result is so far *nil*. No meetings, no anything, save the stereotyped weekly report from the manager. As one who has so far been an extremely heavy loser, and am a large holder of these shares, it will not seem strange if I hereby venture to express my great discontent at the languid, dawdling, lack-lustre way in which operations seem to be carried on. It seems to me that the manager has far too much on his hands, and that with concerns of such magnitude as Roman Gravels and Tankerville (dividend mines), and West Tankerville and Ladywell (progressive), it is scarcely possible that full justice should be done with all now that Leadhills has been entrusted to the same management, seeing that besides the magnitude of the latter mine it is so far distant from the other group of mines. The agent's ability and energy are beyond question, but there must be a limit to every one's powers. I may be quite wrong in all this, and should be glad to have the opinion of those who are better judges, and trust that this may elicit such, but in the meantime I cannot think that Van and Great Laxey would show their grand results if their manager's attention was so distracted. X.

MARKE VALLEY MINE—MANAGEMENT.

SIR,—Being an old shareholder in this mine for many years past, and now having the report of the annual meeting before me as held at the mine, I thought a few remarks about our last 12 months proceedings might be read with interest by those who have to pay a 3s. call on their shares, as well as myself. It is now about 12 months since that I read in your valuable Journal the first report written by Capt. George, who did not forget to sound his trumpet (with a tremendous blast) in his first statements. When read, I was struck with his repeated assertions about the purchase of a new whim, which I considered was not needed, and that with proper management he could make it pay. I was heard to exclaim, it may be so, but I rather doubt it. I notice in your report you say that during the past 18 months we have gone to very heavy expenses in the new shaft, building engine-house, boiler-house, &c., erecting a 26-in. cylinder winding-engine at a cost of 1400*l.*, which has rendered the machinery very efficient. Why is it that the 200*l.* spent in building a magnificent homestead is omitted, or must I count that to my mind uncalled for expenditure as &c.? In the palmy days of 1860 to 1865, when we were paying splendid dividends, the old account-house was considered large enough, but now we have a call-paying mine we must needs erect castles. I have been informed of late that the 60 end has been suspended for nearly a year, and that they have again resumed driving it. Why is it that they have not driven that end the same distance as the 50 end, then they could ventilate them both, but I think they cannot work on the ore discovered in the 50 end more than half their time for foul air? I look on this, if it is so, as a great oversight. Capt. J. Seccombe, previous to his departure for Chili, was driving all the ends from the 20 to the 80, and had it not been for his judicious management in letting all the available ground on tribute, which was the means of discovering thousands of tons of ore, and paying dividends again, we should still be in a worse place. I heard a few months since that our present manager and captain instead of encouraging tributers were quite averse to their employment. It is a mystery to many adventurers how managers of mines are so blind in regard to tributing and tributers; look at South Caradon to-day (what would it be without them) with its small lodes and ramifications. Capt. Seccombe's motto was, I well know for a fact, "Keep your tributers, or lose your dividends." He took the management of this mine when agents, who believed in the tutwork system, pronounced it done, it was poor in sight, but by encouraging tributers he paid us in a short time a dividend, and placed our apparently rotten barque in safe waters. But sorry am I to say that with the promised proper management we seem to be on the decline, and I fear we have not yet seen the worst of it. The day is past for placing men in high positions without they have abilities to fill them, or because they perhaps have married into some captain's family, or are by accident connected through relationship to some of the lords of the land, &c. Under the present depression we want men of sound practical judgment, who can economically spend other people's money, but of late our mine meetings around the Caradon Hills have been very slimy and disagreeable to those

who the agents supposed swallowed the pills so completely; we have stern difficulties to face, calls to pay, and a falling price for copper. But I hope the fair promises in regard to the future will be fully realised, taking into consideration the brilliant prospects which have so often been reported on in the 40 and 50 levels, I hope that they will do better for the future, then we will forget the past.

Liskeard, May 9. —— AN ADVENTURER.

CAPTAIN TREGAY, AND PEDN-AN-DREA MINE.

SIR,—Capt. Tregay's letter in last Saturday's *Mining Journal* shows that he must be willingly misrepresenting the facts. I am also surprised, after his wholesale condemnation of anonymous correspondents, that he has called one to his aid under the *nom de guerre* of "Argus," which meaning a fabulous being of antiquity, any production from such a source naturally deals only in fiction. "Argus" says that he is well acquainted with the facts relating to the sale of Pedn-an-drea Mine, but that matter has not been in dispute; and in attempting to bolster up his client he exposes his complete ignorance of the accounts of the late company, and the loss it made, which are the real points.

Capt. Tregay shall not be allowed to carry on his game of mystification with impunity. I will give the figures from the published official balance-sheets, and your readers will see that I have stated the true facts. In June, 1875, a balance-sheet was issued, which included the costs to "May 14;" the debit balance was shown to be 5924*l.* 13s., and a call of 15s. per share on 9530 shares was made, which (allowing for the discount for prompt payment) would produce (as the subsequent balance-sheet showed) 7015*l.* 19s. 7d. The accounts from this date, therefore, started with a *credit* balance of 1091*l.* 6s., and it is from this time that I shall show the results.

The next balance-sheet, which embraced the accounts from May 14, 1875, to February, 1876, inclu-ive, was issued in March, 1876, and the following was the state of things presented:—

LIABILITIES.

Merchants		£10,726	2	6		
Bankers		834	19	4		
February costs (labour)		1,080	1	3		
Lords' dues		857	12	1		
Total		£13,498	15	2		
ASSETS.						
Amount owing on allotment and calls	2,495	18	2=	£11,002	17	0
Add above credit balance				1,091	6	7
Leaves the loss on working the mine				£12,094	3	7

The next balance-sheet was issued in September, 1876, and included the final costs to August 4, when the figures were:—

LIABILITIES.

Lords' dues		£ 658	8	7		
Merchants		6504	15	4		
Suspense account		449	13	10		
Bill payable		1000	0	0		
Bank		932	15	7		
Total		£9545	13	4		
ASSETS.						
Arrears of calls	£5391	18	5			
Sundry debtors	102	3	2			
Sale of mine and plant, balance	2250	0	0=	£7744	1	7= £1801 11 9
Add sale of mine and plant taken credit for				2500	0	0
Leaves loss on working the mine				£4301	11	9
The total loss from May 14, 1875, to August 1876, fourteen and a-half months				£16,395	15	4

Now, Sir, these are the official figures, and not all Capt. Tregay's jumble of some isolated amounts can alter them. It is lamentable to see the shifts to which he and his advocate are put to flounder out of their difficulties. "Argus" says, that "in the balance-sheet issued by the late company you will find arrears of calls 5391*l.* 18s. 5d. Does 'W. X.' charge Capt. Tregay with having spent that money also?" My answer is, that I give credit for that amount, and all other assets, and only charge the *balance* as loss. Capt. Tregay says that there was only a balance of 1801*l.* 11s. 9d. to meet at last meeting. See how he adopts the *suggestio falsi!* He knows well, as I pointed out in one of my former letters, that credit had been taken in the accounts for the 2500*l.* for which the mine and plant were sold (and it will be seen that the balance—2300*l.*—is included in the assets above), so that he has no right to take that as part of the returns of the mine to diminish the loss in working it. When Capt. Tregay speaks of a call of 4500*l.* being made to meet a balance of 1801*l.*—difference 2719*l.*—and that, therefore, a good sum should come back to the shareholders, he knows well that should this be the case it will come alone from the proceeds of the sale of the property

The long and the short of it is, that during upwards of twenty years, under Capt. Tregay's management for the late company, the total calls exceeded 100,000*l.*, while the total dividends amounted to 1423*l.* 10s., though the average price of tin during that period was much above what it is now. Does Capt. Tregay deny this?

"Argus" says that I appear to assume that I am entitled to answers to my questions. I will leave your readers to judge whether Capt. Tregay is called upon to answer the questions I have put, but I am sure that all will agree with me that if he does attempt to do so that he should stick to the facts, and not persist in denying the figures which are taken from the official documents of his company, the truth of which is only too well known to the shareholders for whom he managed the mine.—*May 8.* W. X.

CAPTAIN TREGAY, AND PEDN-AN-DREA MINES.

SIR,—Capt. Tregay abuses "W. X." because he is an anonymous correspondent, while me he abuses because I am not one, and yet he has apparently secured the services of one to come to his rescue who pursues the same system under the appellation of "Argus," unless it be that Capt. Tregay, with a view of making it appear that he has some one individual supporter, has himself assumed that name, in which case the remark made in his letter of May 2, "for if one hat does not cover the both (myself and "W. X.") they are so exactly alike as two little nigger boys," is applicable to himself. Who "W. X." is I assert most positively I know not. The fact is Capt. Tregay is all bluster, and his remarks are tainted with not a little insolence, by which doubtless he hopes to distract attention from the facts which have been brought forward, and the pertinent questions asked, none of which he, Capt. Tregay, has yet had the manliness to answer in a straightforward manner. If Capt. Tregay's statement of figures is correct, it is simply an admission of irregularity in the accounts of his company in 1875, and that at that time returns were credited which were only estimated, and against which the costs were not charged. In this way things would be made as pleasant as possible for the shareholders, who had to go on paying call upon call (and heavy calls too) till in the end they found themselves to be minus the no inconsiderable sum of 100,000*l.*, and then hand over their property to Capt. Tregay for 2500*l.*, immediately after which, although much lower prices only were obtainable for tin, he is reported (whether truly or not I will not presume to say) to be making good profits.

Capt. Tregay has repeatedly referred to a balance-sheet in February, 1876, and "Argus" (who if really is other than Capt. Tregay himself is evidently prompted by him) also says that "there *must* have been a balance struck in February." Why must? I have made enquiries, and find that a meeting was called for February, at which meeting it was resolved—"In the absence of the (then) secretary, and also of all books and accounts of the company," that the committee be empowered to appoint another secretary, "and to call another meeting in about a month from date," &c. Accordingly a meeting was held in March, when a balance sheet, which gave the accounts from May 14, 1875, to February, 1876, inclusive, was presented, showing a debit balance of 11,000*l.*, a call of 11,300*l.* being then made.

So much for Capt. Tregay's assertions, and it is to be hoped that he is keeping his accounts on a different system to what he describes was formerly done, as it is very easy to show apparent profits if not only actual, but "estimated," sales of tin are credited for some months in advance of costs. A few years ago a certain tin mine in Cornwall paid dividends for some time, but shortly after it got into the Stannaries Court, when it was found to have large liabilities, and heavy calls were made to meet them. Another, and a more recent case, of a lead mine which paid large quarterly dividends, upon the faith of the "fictitious" good balances presented time after time, by crediting mineral as sold before it was even broken underground, until at last the "fictitious" good balances were reduced to a small, "but still fictitious," balance of some 500*l.*, when it was proved very shortly afterwards that instead of the shareholders having 500*l.* to the good they were more than 7500*l.* in debt, necessitating unexpected and heavy calls to be made, thus proving the pernicious and unjust act of crediting or estimating mineral not actually sold, or in at least a marketable state for immediate sale.

The debit balances shown in the published official accounts for the final 14½ months of the late Pedn-an-drea Mine Company amounted to upwards of 16,000*l.* Capt. Tregay says these accounts were wrong. This is a question he must settle with the shareholders, but in the meantime we can only be guided by the official documents, which can be seen and inspected by any shareholder in the late company. There is no question, however, that in the period mentioned the calls amounted to 15,800*l.* I presume Capt. Tregay does not deny that the total calls were 101,803*l.*, and that for more than 20 years, during which time the price of tin averaged considerably above present price, the whole sum divided amongst the shareholders was but 1423*l.* 10s. Will he tell us whether it is true that he is now making the mine yield good profits? And if so, will he explain how it is that, having got hold of the mine for himself only last autumn, he is able, under the disadvantage of so much lower price for tin, to do so very different, and in so short a time, what he did not, or I put it could not, do for the late company? GRANVILLE SHARP.

London, May 10.

GRANVILLE SHARP, "W. X.," PEDN-AN-DREA, TREGAY, AND "ARGUS."

SIR,—What is all this row about? This correspondence should have followed Shakespeare's comedy, "Much Ado about Nothing." Anyone to read Mr. Sharp's letter would think that he was the aggrieved party, instead of which it turns out that he was not interested at all in the matter, only seeking profitable employment. Then "W. X.," who we must take as Mr. Granville Sharp's double, follows up the matter in the same strain, only just a little coarser. Both these writers seem to refrain from making any statements as much as possible, rather following the safer course of putting forward suggestive questions. This is, no donbt, the most cunning mode of attack, but not always the most honourable. It sometimes shows that the attacking party have not much grounds to found charges on, but wish to draw matter from the party attacked for the purpose of being able to make statements. These suggestive questions, skilfully handled, are also pretty sure to damage your adversary on the very safe calculation that the majority of people are quite ready to believe evil. They find, however, that Capt. Tregay is rather too old a campaigner to be easily drawn out of his entrenchments by any amount of hectoring until an opportunity offers that he may deal a trenchant blow. I fancy that Mr. Granville Sharp must have rather felt this this week, when his first positive statement was so unceremoniously dealt with, and himself proved to be altogether wrong. Capt. Tregay, you see, refuses to answer any of their questions, and I think on sufficient reasons, for they are put forward by men who cannot show that they are in any way entitled to claim any right to their being answered, even if they were fairly put, which they are not, and I do not see that any such questions should have been put. There appears to be a very general opinion that Capt. Tregay went through the whole of this business connected with the purchase and transfer of the mine in a very straightforward manner, and is entitled to some credit for continuing them in operation. That he has the best of the bargain there are not, probably, two opinions, and there is the pinch. Why will he not share with some other fellow? Whether his purchasing the mine in the way he did was so much of a fluke as he makes it I do not pretend to say. If so, then he is one of the most fortunate of men, for people do not generally tumble upon a fortune without management. Yet it is not impossible, for I do not see why that or many other more improbable things should not happen when we see that nine-tenths of the success of every man comes to him in a way he does not exactly calculate, and much of it from circumstances quite beyond his control. However this may be, Tregay has got the mine, and is doing very well with it, so he must expect people to envy him, whether they believe that he got it fairly or not, and that some will try to make it appear that he did not. Mr. Granville Sharp does not appear to have much faith in innocence, or in innocent people; neither has "W. X." Perhaps they are right. This being so, what reason have they to complain of one should he not turn out more innocent than other people are? Neither do I see what Tregay has to complain of, for if he believes what he tells us that he has tumbled into a good thing without any scheming at all, from sheer luck, &c., as a true believer in his destiny he should believe that he cannot avoid the blowing up which must be destined also, and he should quietly smoke his chibouqe in peace. While if, on the other hand, there has been a little scheming he deserves being pitched into, and has no reason for kicking up such a row.

Now, what shall we say of "Argus?" He no doubt has written for a laudable purpose, and has written a good letter, but was it wanted? Tregay seems too many guns for his opponents already, and to judge from his prompt and ready replies one must think that he rather likes it. When both sides are eager for the fray who can separate them? Possibly it may suit Mr. Granville Sharp to keep his name before the world whether he is right or not, and as Tregay seems to like it too, why not let them squabble for our amusement and edification. I have no doubt we shall see that Tregay will be making some enquiries, and asking some questions regarding some of Mr. Granville Sharp's mines soon, and why not? But I do not like this half-and-half sort of a row. Let them pitch into each other fairly with a little more fire, as I generally see in countries where I visit.

PHISTO.

NEW CONSOLS MINE, AND THE CONCENTRATION OF COPPER ORES.

SIR,—I beg to inform your correspondent, "C. H.," that "Cousin Jack's Unpublished MSS." does not emanate from my pen; and with reference to the great loss of copper and silver suffered by all copper mines at home or abroad, it is admitted generally without dissent that such has been the case from time immemorial, and no effectual remedy ever existed until the Nascent Process was introduced into Cornwall, which by chemically treating every ton of ore as raised from underground, whether an average of 1 or 10 per cent., reduces the loss to a very minimum, and the Nascent Process has only to be combined with the cheap method of chlorination lately discovered to make mining the very best investment of the day.

We certainly live in a strange age, a deal of fuss is made about the loss of 5 or 6 lbs. of tin to the ton of stuff, worth 2s. 6d. at the most, and yet never is a ton of copper put to water for the purpose of dressing without several times that value being wasted, but the tin tells its tale in the slimes and the catch pits, of which we hear so much, occupied by the many ready to pick up the few crumbs of comfort falling from the rich man's table, whereas copper waste of 1 per cent., or 22 lbs. per ton of stuff, is of no value to the ordinary dresser, simply because he cannot concentrate it; and as for the copper in solution, it vanishes as a dream.

I now ask emphatically, well knowing this Journal will be perused by thousands of practical men, why in the name of reason is so much fuss made about 2s. 6d. worth of tin, which does benefit somebody, when 15s. worth of copper is allowed to pass away with not one solitary out-stretched hand to grasp it? Now, which is worth the most, pound for pound—copper or tin? Echo answers, and always speaks the truth, copper, and when treated by the Nascent process, which secures the silver packed, as it were, with the copper it is of far greater value than tin. Yes, facts and figures again show us that amongst the many flagrant errors and vicissitudes of mining modern philosophy is, as usual, ever ready to help the weak by administering a kick, which is about the only reason gathered for 2s. 6d. being worth more than 15s.

Again I ask, after having proved that copper has a greater money value than tin, is the former article so scarce in comparison with the latter that the loss is hardly worth noticing? Far from it, when statistics show how much in advance are the returns of copper ore to tin, and we must take into consideration that 1½ per cent. tin ore is very rich as an average, whereas 1½ per cent. copper has hitherto been looked upon as worthless; the whole matter revolves itself into a few words.—1. Where 10 tons of tin ore 1½ per cent. exist throughout Devon and Cornwall, it is more easy to find 100 tons 1½ per cent. copper ore.—2. It costs less to work an ordinary copper mine than tin, especially when only in search of 1½ per cent copper, since 1½ per cent. copper is the minimum, and 1½ per cent. tin, with a few exceptions, the maximum quality.—3. Copper ore can be crushed and treated by the chemical process cheaper than tin ore can be stamped, dressed, and made merchantable.—4. The present money value contained in 1½ per cent. tin ore is 15s., copper 20s., not including silver.—5. The large discoveries of tin abroad affect seriously the English tin mines, whereas English copper mines by the Nascent Process, and the latest novelties in chlorination will always hold their own. To wit, foreign copper lodes an inch as a rule, but contain comparatively very little more silver than the poorest English ores, and as by aiming at an average of only 1½ per cent. copper, like tin mines, large bodies of stuff will be treated, taking only 50 tons per day of 3 oz. silver; this result added to copper will be considerable, in a word, the time is not far distant when all English copper, the same as tin, mines will concentrate their ores before offering them to the smelters, and it stands to reason that an English article, chemically concentrated giving 60 per cent. copper and 150 ozs. silver per ton with little carriage, can compete against foreign copper ores of 20 per cent. with no silver to value.—6. Hardly a week passes without some of your numerous correspondents (signing their real names, too) dilating upon the extraordinary riches of our home copper mines in the past, marvellous revelations being given as to this and the other mine yielding 100,000*l.*, 300,000*l.*, and so on profits; what, then, I ask, would such properties achieve under the entirely new process, which looks for only 1½ per cent. copper and 3 ozs. silver per ton., and would, if it had 100 tons 5 per cent. and 900 tons 1½ per cent. separated by Nature or the old handicraft art of dressing upon the surface mix the two together in order to secure the whole of the silver? Now is the opportunity for large fortunes to be realised without risk by those who join me in an undertaking which will completely revolutionise, and at the most critical and opportune moment, save English copper mining.

Bishopsgate-street, London, May 4. THOS. J. BARNARD.

THE CONCENTRATION OF ORES.

SIR,—I endeavoured last week to prove to the mining community at large how easy it is for English copper mines to be made commercially successful by adopting the requisite chemical concentrating process, and will now essay to show, in a similar manner, the productive results that may be gained likewise by ordinary, or the very poorest of poor foreign mines; but before doing so would draw attention to the letters written by Messrs. Charles Bawden and R. Symons, in last week's Journal, upon the Gwennap district. What wealth is depicted by these two gentlemen, utter strangers to me. A very Eldorado appears before our vision! Talk about the "rhapsodies" of a certain individual, they are certainly at once and for ever thrown in the shade when an epitome is calmly given of copper mines having in this part yielded their half millions profits, to say nothing of as much, and perhaps more, copper and silver washed away. *Mais revenons à nos montons*, let us say a few words upon foreign mining; and, as its chief associate is gold, then let the subject be gold itself. Who can come forward and dispute that for ages scientists, chemists, and philosophers one and all have declared, without a dissentient voice, that gold is never discovered only in a metallic form, and it has, therefore, been left, possibly predestined, for a very humble individual to prove the utter fallacy of the supposition, for by the Nascent Process I have repeatedly operated upon ores giving only 1 dwt. of gold per ton, and collected the same in a concentrated form with the copper and silver, thus proving that the gold must have passed into a chloride when in its nascent or embryonic transformation. Metallic iron attacks it, with the chloride of copper and silver in solution, hence to convert gold into a chloride it must naturally and positively have been originally a sulphide; and, depend upon it, that the foreign mines abandoned solely on account of gold and silver being mixed with the baser metal, copper, by a correct manipulation of the Nascent Process, and effectual and economical chlorination of their ores, will yet become the richest prizes. I intended to write more fully, but am prevented, and, therefore, hastily close. T. J. BARNARD.

Bishopsgate-street Within, May 9.

LANNER VALLEY.

SIR,—Lannarth (commonly called "Lanner") is the name of a village and of several small farms in the parish of Gwennap, in Cornwall. There is another Lanner (a farm) in the same parish, about three miles eastward of this. The ancient village of Lanner, or Lannarth, consisted of a very few houses, having severally a few inclosures attached belonging to sundry lords, Mr. E. Beauchamp, and others. Lanner is now a large scattered village, containing about 400 houses (about 2000 inhabitants), mostly erected by miners who were formerly employed at the mines in the parish and its neighbourhood, which mines are now nearly all abandoned. Notwithstanding this few houses are uninhabited; indeed, very few comparatively of the hundreds of houses in St. Day, Carharrack, &c., are without occupiers. Strange as it may seem, many of the miners go into other parishes to work, and to retain their old homes they walk many miles to and from their point of labour, and many miners have sought labour in foreign lands, leaving their wives and families in possession of their dwellings. Most of such miners, having love for "their own," regularly, if possible, remit money for their maintenance, but some who are "without natural affection," and worse than brutes, leave their wives and children to do the best they can for themselves. The village as now constituted is partly in Pennance, the land of Buller and Clinton; partly in Bell, the land of Mr. J. J. Rogers; in Bell Veor, that of Mr. Beauchamp and Lord Clinton; in Tressavean, the land of Mr. Rogers; and in Lannarth as before mentioned. It contains the scattered village of Rough Street, an ancient place on the road from the turnpike to Penstruthal. Very few of the numerous houses known by the name of Lanner existed 50 years ago. Lannarth is also the name of an ecclesiastical district, taken out of Gwennap parish, and contains — acres, and a population of 2348 (1871), whose souls are placed under the care of the Rev. J. B. D. Hopgood, M.A., who is a noted mechanical religionist. The church is a very plain building, of small dimensions, without a tower or steeple, but with a bell turret, whence issues the call to prayers several times a day, but the call is lamentably unheeded, the attendance being given by the minister almost alone. He is said to be a clever man, but his religion consists chiefly in hating dissent and in mechanical motions. A man lately passing along the road in front of the church at 11 P.M. seeing light in the church felt desirous to ascertain the number of worshipers within it. He found the number to be three—Mr. Hopgood, his wife, and servant. Near the church is one of the parson's eyesores—the Wesleyan Chapel, built partly in 1828, and enlarged in 1844, containing side and end galleries, connected with which is a good society and Sunday and day schools. At no great distance northward is a chapel belonging to the Bible Christians, built a few years ago, and since enlarged. About a quarter of a mile eastward from the last-named chapel is that of the Primitive Methodists, a smaller building than either of the others. Their original, still smaller, chapel is in ruins. A mile north of the village is "Gwennap Pit," where the Rev. J. Wesley preached. In the village are numerous grocers' and some drapers and other shops. There is also a good inn, known by the sign of the "Commercial Inn," kept by Mr. John Prisk, who is distinguished for the good order maintained in the house, and for the purity and strength of the drinks supplied by him. On Penstruthal pay-day his house is well filled. There was another licensed victualler's half a mile eastward, but the license is likely to be given up soon. There is a beer-shop also in the village, said to be kept by a man who married without going to church. At Comford village, a mile eastward, is an ancient inn, known by the sign of "the Hare and Hounds," which was much frequented during the prosperity of the mining interest in Gwennap, but now otherwise; 50 years ago it was kept by Mr. Andrew, who went to the Hotel, Redruth, now kept by Mr. Tabb.

The Lanner valley commences about half a mile north-west of the village. The northern side or slope begins with Carnarth, on the side of which is Pennance aforesaid; then comes Trevarth, a manor and small village, property of Lord Clinton; then Trevarth House and land, the property of Lord Mount Edgcumbe. Trevarth House Academy is there, kept by Mr. Green, for the education of young gentlemen in both the higher and lower brances of education. It was previously kept by Mr. John Hawken, deceased, for a period of nearly half-a-century, who had a high reputation for the good commercial and moral training imparted to his pupils. Many of the intelligent mine agents and clerks of the district received their education here. Adjoining Trevarth is Trevince, the seat of Mr. E. B. Beauchamp. It was one of the ancient residences of the Beauchamp family; lately that of Mr. Michael Williams, M.P., the father of

Mr. J. M. Williams, of Pengreep and Carhayes Castle. Mr. Beauchamp has re-edified the house, which is a delightful residence. He has also added to the plantations, which were commenced by Mr. Williams 50 or 60 years ago. The other seat of the Beauchamps is Pengreep, now occupied by Mr. J. M. Williams. Eastward of Trevince is Cosgarne, a manor of 1000 acres, belonging to Lord Clifford, Lord Clinton, and others, within which the celebrated mines of Consols and United Mines are situated. In the village of Lower Cosgarne there are two good farmhouses, belonging respectively to Mr. P. Blamey and Mr. Pascoe, and in Higher Cosgarne there is a good house and land, the leasehold of Mr. William Simmons. This manor brings us to Point Stamps, the junction of the valley with Bessow valley, which is also the valley from Chacewater. We will now speak of the southern side of Lanner valley. Lannarth is under grant to Penstruthal Mining Company; Bell Vean is now being, or about to be, worked for tin and copper by a company formed by Capt. J. Parkyn, of Roche; Bell Veor is under grant to Mr. Peter, of Redruth, and worked for copper, of which a rich lode has lately been cut at the adit level; Tresavean is also under grant to Mr. Peter. The next estate is Treviskey, the land of Mr. Beauchamp and others—no grant existing. Penventin is also the land of Mr. Beauchamp—no mine in it. Dowsers (diviners) should be employed to find the lodes here. Dr. Whitworth, of St. Agnes, is a good dowser, and would I daresay for a fee point out the lodes from the use of the twig. Next comes Gwennap Church and glebe, the property of the Rev. S. Rogers and the Ecclesiastical Commissioners, mixed up with which are several closes, the property of Mr. Rashleigh. Through these lands an adit to intersect Tresavean lode was unsuccessfully driven many years ago. Mr. Rogers is not only a good man but a man of science and a patron of many useful institutions. The church has no tower, but there is a belfry, and a bell to toll people to church. Eastward of the glebe we find Tresamble, the land of Mr. Basset, of Tehidy, in which there is no mine worthy of mention. Then comes Tresamble Vean, the lands of Lord Clinton and Mr. St. Aubyn. In this estate is situate South United Mines, worked to about 40 fathoms under a shallow adit. Eastward of this we come to Trehaddle, the land of Lord Clinton (no mine in it), and Lanner, the land of Lord Robartes—no mine. Then we reach Chycoose, in which is an abandoned mine called East Tresavean. This estate, the property of several owners, is opposite to Point Stamps, above mentioned, and extends nearly to Bessow Bridge. A commanding view of the Lanner valley is to be had at the higher part of the West Tresavean Mine. A TOURIST.

Lanner, May 7.

CARDIGANSHIRE MINES, A.D. 1877—No. XIV.

SIR,—In my last, in treating of the Bwlch Consols, it would appear that I omitted, in saying these mines had yielded hundreds of pounds, the word thousands. The reading should have been "hundreds of thousands of pounds worth," instead of "hundreds of pounds worth."

I will next take the Level Reich and Goginan, which are really the Goginan, as they are in the same grant, and worked by the same company. Some time ago a lot of new machinery was erected on the Level Reich portion of the sett, which is on the Pen-Craieg-du lode, and from all that could be seen it was thought it would have been worked extensively, but it all ended in smoke. Fresh capital has been raised within the last three years, and a good deal of money expended in new dressing machinery, which is still being added to at great cost. If new machinery will bring new courses of ore I should recommend the erection of it *ad libitum*, but as that, unfortunately, is not the case, I rather think that if a goodly portion thus expended went to develope the underground operations the shareholders would be quite as well off, and perhaps a little better, than by the present mode of applying it. Since my late brother and myself were connected with this mine hundreds of thousands of pounds worth of ore has been extracted from the bunch of ore then discovered, and all this at an absolute loss to the adventurers. I do not intend to dwell or to harp on this subject, and shall content myself by saying that if the mine had been worked on the same principle as the Van—by sinking the engine-shaft (say) 10 fathoms every year, and extending the deeper levels through the grant—Goginan at this day would be returning the same amount of ore as when we left it, which was 200 tons monthly, and would be giving 1000*l.* per month in profits.

We will now go to West Cwm-Erfin, or Melindwr Valley. There are several lodes in this grant, and in order to make the mine a paying one the whole of them must receive attention. The best lode in the sett has only been seen at surface.

Under the same management comes West Goginan, where a large outlay has been made in the erection of machinery and in developing a side lode, where no profits ever were or ever will be made. The great main lode of Goginan stands untouched throughout the grant, and if means were adopted to see it at (say) 30 fms. from surface, instead of throwing any more money away on the work I have alluded to (unless, indeed, all the money is exhausted) there is still hope of the shareholders being rewarded for the money so badly spent. That there is an abundance of ore, and in paying quantities, both here and in Melindwr Valley, does not admit of doubt, and it only remains to work them judiciously to make them great and lasting paying mines. ABSALOM FRANCIS.

Goginan, Aberystwith, May 8.

CATHEDRAL AND PENSTRUTHAL MINES—GWENNAP DISTRICT.

SIR,—Having from time to time read some very interesting and instructive letters in your valuable Journal in reference to the great mineral wealth of the Gwennap district, I am quite at a loss to understand why the shares in the Cathedral and Penstruthal Mines, which I believe to be two of the most promising in the district, should be selling at such a low price. I refer more particularly to the latter, as there are few progressive mines on the London market that can show such unmistakeable signs of becoming so great a success; handsome monthly profits are now being realised from the sale of tin and copper; the company has a large capital at command, and I believe another dividend will soon be announced. The most important feature in this mine is the discovery of copper, made about a year and a half ago, which has been gradually increasing in value; they are down to about the same depth at which the adjoining mine, the Tresavean, made nearly 500,000*l.* in profits. The indications being identical, similar results are, therefore, expected. They are now penetrating the oxides of copper, which in this district have always been the forerunners of large deposits of ore. Another mine adjoining, Wheal Buller, made about the same amount of profit. In the Tresavean Mine it appears that tin ore was in the first place found in the granite—extending from the surface to about 70 fms. below—then irregular upshoots of copper were found, and the next level piercing the main body of the ore, the tin gradually decreased, and finally disappeared, the copper becoming permanent and extending to the junction of the granite with the killas. A somewhat similar phenomena now presents itself in the Penstruthal, which, though at the present time is returning more tin than copper, yet, from the gradually increasing returns of this latter metal there can be but one opinion—that before long it will become a great copper mine. The productiveness of the copper mines in the Gwennap district has been almost fabulous, and previous to the discovery of the Lake Superior and Chilian mines the greater portion of the copper in use throughout the world was the produce from the mines in the Gwennap district, and even so late as ten years ago the United Mines, which are situated to the east of Penstruthal and working on a continuation of the same lodes, yielded about a quarter of a million profit within a few years. The Cathedral Mine also holds out the prospects of becoming a very profitable undertaking upon further development. ONE WHO OBSERVES.

TAN-YR-ALLT MINE—SPECIAL REPORT.

May 9.—Having this day carefully inspected the workings of the above mine, I have to report:—An adit level cross-cut has been driven under some old workings to cut a lode which is running about 20° west of north and east of south; having cut this lode, the level is continued on the course of it for a considerable distance, and in several places what appear to be the tops of shoots of ore have been cut. A drawing shaft and three winzes have been sunk to a 12 fm. level, in driving which a very fine course of ore was laid open, about 14 fms. in length; this is dipping very flat to the north. The main shaft has been continued down to the 22, where a level has been driven north to intersect the course of ore seen above; it is not, however, in my opinion as yet driven sufficiently far to do so, and I would strongly recommend its being pushed on north with all dispatch. The lode in the stope is worth from 45*l.* to 50*l.* per fm. for lead ore, and is equal to anything I have yet seen in this district, and I have had an experience of upwards of 25 years as agent of Egair-hir, Havan and Henfwlwych, and other mines in the vicinity. Further south than any of the present workings is a run of east and west lodes, which have proved highly productive in an adjoining mine (Penpompren), and by driving on the present adit these lodes would be intersected, and there is not the slightest doubt but that rich deposits of ore would be met with. There is a very fine pile of ore at surface. I saw some lumps of solid ore weighing from 2 to 3 cwts. each, I estimate about 20 tons in all. All the machinery for pumping crushing, &c., is of the best description, except the jiggers, and I was informed a new patent jigger was about being erected. The mine has great facilities for carriage, being on the high road between Aberystwith and Machynlleth, about 2½ miles from Llanfihangel Railway Station.—JOHN HUGHES.

Meetings of Public Companies.

SOUTH AURORA CONSOLIDATED MINING COMPANY.

The adjourned ordinary general meeting of proprietors was held at the Cannon-street Hotel, on Monday,—Mr. W. SPRATT in the chair.

Mr. CHARLES CADOGAN (the secretary) read the notice calling the meeting, and the report of the directors was taken as read.

The CHAIRMAN called attention to the first paragraph in the report, in which the directors stated that—"In spite of the great care, anxiety, and trouble taken by them during the past year, the present result of their labours should be so far unsatisfactory. They have done their utmost to promote the company's interests, and regret they cannot command success." Now, these were not idle words—they were words which were perfectly sincere, and he did not know that the directors could have stated in more concise language the enormous amount of trouble and anxiety which they had had to go through, and the board deeply regretted that, in spite of it all, the results should have been so unsatisfactory. In the paragraph just quoted the directors stated that they could not "command success," but certainly no men had ever tried harder to deserve it. (Hear, hear.) He need scarcely tell them that mining was a speculation, and there was a great deal of truth in the old Cornish mining proverb that "A miner cannot see further than his pick;" and although there were people who devoted years after years in studying mineralogy and geology who could tell mining shareholders what ought to be expected, yet somehow or other Nature was very peculiar, and often disappointed the expectations which were formed. Take, for instance, the first property mentioned in the report of the directors, the Anguilla Phosphate Company, of which Mr. Henwood, no mean authority upon phosphates, entertained a good opinion. In the report issued in 1875 the directors gave the shareholders Capt. Henwood's report, and also as much information as they possibly could with respect to the several properties in which was invested some portion of the funds of the shareholders. But to go back for a moment to the Anquilla property. The reports concerning it were so satisfactory that the board sent out Capt. Anthony, as the company's own special agent, who confirmed all that was said in favour of these properties; and yet after working some distance, and spending the money, the board was told that it was simply a deposit which was worked out, and they were recommended not to spend any more money upon it. Of course, nothing could be more unsatisfactory to the directors in London, some thousands of miles away from the scene of operations, to be first told that there was an opportunity of fairly investing the money, and then, after having spent a certain portion of the money, to be told by the same people that there was nothing to be done. (Hear, hear.) Yet the directors had to put up with the opprobrium which attached to people who were not successful. There was no doubt that nothing succeeded like the success, but the directors had to come before the shareholders year after year, and tell them that they had done the best they could, but had failed to command success, although no men better deserved it. The board had arranged to spend 500*l.* upon the property, but luckily they had stopped at 300*l.* He read an extract from a report signed by Mr. C. Henwood, under date Dec. 2, 1875, with regard to the satisfactory prospects of the undertaking, and went on to say that the board must throw the whole of the blame upon Mr. Henwood, because it was not right that the directors should carry a load which did not belong to them. The board was not composed of self-made directors, but each director was a representative man, having been chosen from the body of shareholders from time to time, and he supposed the shareholders had confidence in the men they had thus selected, or they would not have placed them in the responsible position of directors. (Hear, hear.) The board had done the best they could, but had failed, and no doubt confidence was, to a certain extent, shaken by these slaps in the face. The report next referred to the Aberbeeg Collieries. The directors were accused some time ago of going all over the earth, but what were the facts? There was a certain sum of money at the bank at 1 per cent., and the directors had the opportunity of using it at a much more productive rate of interest. The money was only asked for for one year, and certainly no men could take more trouble over a matter than the directors did over this. It was a matter running over two or three months, it was anxiously and carefully discussed and turned inside out, and was only finally settled when the board had such information as seemed to guarantee the thing beyond all doubt. The board did not take the representations of the parties who applied for the loan, but, knowing that the collieries were under Government surveillance, they ascertained who was the Government agent, and they asked that gentleman if it was compatible with his position and duties to let the directors know whether the property would be a good and safe security for an advance of 5000*l.* From the position which the Government agent occupied there was a doubt whether he could report specially on any private property, and, therefore, the directors put in their letter a clause requesting that gentleman if he could not undertake the matter himself to place it in the hands of a good local authority, who knew the district well. The Government agent wrote to say that he was prohibited by special instructions and Act of Parliament from reporting on the property, but recommended his father, Mr. Jas. Cadman, of Pontypool, who had had great experience in mining—an experience extending over 40 or 50 years. The directors accordingly addressed Mr. James Cadman, and asked him whether the property would be a safe security for an advance of 5000*l.*, and an answer was received from Mr. Cadman to the effect that he had visited the works, and examined the underground and surface workings, together with the plant, machinery, &c., and was of opinion that it was a valuable property, and that the sum of 5000*l.* might with great safety be advanced thereon. But some of the gentlemen on the board thought that was not sufficient, and the directors again wrote and asked Mr. Cadman whether he thought that the property would realise on a forced sale 5000*l.* on a first mortgage, and Mr. Cadman replied, giving it as his opinion that the property would realise that amount under any circumstances. Now, surely, after hearing that correspondence, and knowing the care and pains which had been bestowed upon the matter, the shareholders could not blame gentlemen for utilising and trying to get 8 or 10 per cent. for money which was then lying at 1 per cent., with further prospective advantages when the loan was paid off. (Hear, hear.) With respect to the Mammoth Copperopolis, that loan had been said to be lost, but what were the facts? The loan was for 2000*l.*, of which this company had received back 1200*l.* in cash, and as security for the balance held 1500*l.* in first-class debentures, carrying 15 per cent. interest, and 1000*l.* in fully paid-up shares.

A SHAREHOLDER: Is it being worked?—The CHAIRMAN said it was not, but would fall back to the company in October next. For some time past there had been found a difficulty in treating the quartz ore; every surveyor had given an opinion that there were upwards of 100,000 tons in sight, but up to the present time they could not utilise it. There was something in the ore they could not tackle; but last week the directors had a letter from the mine to the effect that they had found out that by roasting the ore first it made it capital milling ore, and it could now be treated.

A SHAREHOLDER: What ore is it?—The CHAIRMAN: Gold, silver, and a little antimony. In October it will fall back to the company, and they, no doubt, would then endeavour to work the ore, and pay back the company the large sums of money advanced upon it. With regard to the Gilbert and Chaudière Company, this company had nothing to do with it, but were interested in it. Since the last meeting the Gilbert Company had not had the means of working it, but Mr. Lock Wood, out of his own means, endeavoured to work it, but in the winter, when the weather was very cold, a fire occurred, which burned down all the wooden huts, and stopped progress, but that as far as the property itself was concerned, it must be extremely satisfactory to the shareholders to know that Mr. Clarke, the Government agent from Australia, one of the English Government officers, had been to see it, and said he had never seen a finer property in his life, and added that if he had it in Australia thousands of men would be at work upon it. This had been corroborated by a gentleman who was the vendor of the Ballarat workings, who stated he had never seen such a fine gold field, and had taken a piece of land near, which he would work on tribute, and he had expressed an opinion that as soon as it was known that he was there, there would be many of his old followers at work upon it. As regarded the Treasure Hill Tunnel, there had been considerable difference of opinion upon that subject; some thought it was the right thing to do, and others that it was throwing money away. For a long time the matter was discussed, and the shareholders would remember it was decided as far as this company was concerned that no more money should be spent upon it by the South Aurora Company but that they should bide the working of the Eberhardt and Aurora Company. The arrangement which had been come to for this company to take part in the deep tunnel had been received with a great deal of good will by, perhaps, a majority of shareholders; some wrote to advise the directors to have nothing to do with it, but he thought the large majority were of opinion that it was the right thing to do. He was sorry that Mr. Applegarth, who was a director of the Eberhardt and Aurora, was not present, being engaged on a trial, but if he had been present he could have told them exactly how the matter stood. He thought, however, he was right in saying that the tunnel was supposed to strike the lode some 1200 ft. below the surface. Independently of driving the tunnel at that depth, there was the driftway down from the surface of the mine, and they were down some 1000 ft. or so, and the last information was that Capt. Drake was very pleased indeed with his efforts so far, and was following the lode down, and had no doubt in his own mind that he would find it down in the deep. If this company was fortunate when the tunnel was being driven to strike the lode, then the disappointment which they had all felt from having had so little return for their money would take a turn, and there could be very little doubt that the shares instead of figuring at 10*s.* would be at a much higher figure.

A SHAREHOLDER said the price of the shares was 2*s.* 6*d.* per share.—The CHAIRMAN said that was not so. A short time since a man said he could sell some shares at 7*s.*, and he (the Chairman) ordered 1000 at the price, and after three weeks the man brought only 50, and he (the Chairman) said "Take them back again." Some weeks previously he had offered to take shares at 10*s.*, but could not get them. As far as the tunnel was concerned, there was a fair chance, under Capt. Drake's management, of the South Aurora Mine turning out well after all. Capt. Drake had gone down 1000 ft., and if he continued another 200 ft. there was a fair chance of the shareholders of the South Aurora getting a return. The report next referred to the Lama and Olmeta Mines, in Corsica. Here the directors had had some considerable trouble; it was very easy to get properties to work, but as soon as they got to work difficulties arose. For full and detailed information regarding this property he must refer the shareholders to the pamphlet which the board sent out at the end of 1875, which contained two or three reports made by men who had been well recommended to the board. The fullest information was submitted to the shareholders, who must, as far as the arrangements were concerned, be considered as being as fully cognisant of the matter as the directors themselves. Some little difficulty was got into with one of the mines on account of the concession, and not being satisfied with the reports from the spot, the board took a course which he thought would commend itself to the shareholders. There happened to be a gentleman, a shareholder, who took a great interest in the welfare of the company, who spoke French and Italian, and was acclimatised to the country, and who happened at the time to be free from any engagements. This gentleman was Dr. Gallen, and the board engaged him to go over and examine the thing thoroughly, and armed him with power to look at the accounts, and the power of appointment and dismissal—in fact, all the powers which the directors possessed themselves. It was a good thing the directors sent out such a man, for he found that the manager was not of the practical nature which they had a right to expect. Things there were now in as good a position as possible; everything was in good order, and the little difficulties which had arisen with the proprietors had been removed. It so happened that this company was on a man's piece of land for which they had not the concession fully in their hands, and the man demanded a fabulous sum, some 4000*l.* or 5000*l.*, to allow the property to be worked; but Dr. Gallen was not to be taken in in that way, and quietly went to an adjoining owner and obtained a piece of land for 100*l.*, and in sinking down upon that he found what he wanted. Another thing occurred with regard to this piece of ground, as the working went on it developed better and better, and in one letter Dr. Gallen wrote that the piece of land which he had acquired for 100*l.* would be worth to the company not less than 10,000*l.* (Hear, hear.) On the Corsican property some 10,000*l.* or 12,000*l.* was invested; the directors could not guarantee a good harvest from the seed thus sown, but having sown in faith he hoped, if they lived long enough, they would reap in faith. (Hear, hear.) As regarded Dr. Gallen, he was a gentleman, and a thorough man of business, and had an admirable idea of dealing with the people out there. He might mention that the ore there averaged from 5 to 10 per cent., but the cost of moving it from the mine down to the port, and from the port down to the place of sale, such as Marseilles, costs so much that the directors found they were losing money, and they asked what could be done? Dr. Gallen said—"Put up reduction works, which will cost 2000*l.* or 3000*l.*; there will be just this difference, if, instead of carrying 100 lbs. weight of material which contain 10 lbs. of ore, we carry simply the 10 lbs. of ore, we save nine-tenths of the expense of profit and the means of profit." Therefore, the erection of the reduction works was warranted. There were 2000 tons of ore on the dumps, and another 2000 in reserve, and the directors were now arranging with good people for the erection of the reduction works on reasonable terms. From the report it would be seen that since the last meeting Mr. Gold had resigned on account of the state of his health not permitting him to give the time he deemed desirable to the affairs of the company. The directors were very sorry that Mr. Gold had felt himself compelled to resign, because in him they had lost a colleague of great ability, and who looked thoroughly into everything which came before him. (Hear, hear.) The directors had not filled up the vacancy, thinking there was no necessity to do so at present, and a saving to the shareholders of 100*l.* a year was effected. Mr. Towne retired, and offered himself for re-election, and he was pleased he did so, because if Mr. Towne went he thought that he himself should go to. They had worked cordially together, they meant right, and had done right, and as long as the present board remained the representatives of the shareholders, they would continue to do what was right. Mr. Ford, the auditor, retired, and offered himself for re-election. Mr. Ford was extremely careful, and he was sure the shareholders could not have a better man to represent them as auditor. The rest of the report referred to the holding of shares. There 40,000*l.* worth of Olmeta Copper, 40,000*l.* of the Lama Company, and other smaller amounts, making up a total of the large amount of 93,000*l.*, which, if they turned out all right, would be worth that amount. It must be borne in mind that the present company commenced with 30,000*l.* of capital. Some gentleman had said—"What have you done with the 300,000*l.* capital which you had?" Well, as a matter of fact, they never had 300,000*l.* capital; they never had more than 30,000*l.*, and if the shareholders looked at the accounts they would see what had been done with it, and if the company were fortunate in anything turning up it would not have been so badly employed. If Dr. Gallen were right they had hit upon a fine piece of ore, and that which was bought for 100*l.* would produce 10,000*l.*: it was also possible that there they might come upon some other piece of property, and then they would be able to turn it into cash, and the sooner the better. At the South Aurora Mine they had done nothing, and the directors were awaiting the result of the tunnel. The mill was very valuable, and there were the tailings, which were worth 3000*l.* or 4000*l.* at a low calculation. Therefore, there was there a valuable property, which was not brought into account. He believed the mill alone cost 30,000*l.*, and, as he had said, the tailings were worth between 3000*l.* and 4000*l.* In conclusion, the Chairman moved the adoption of the report and accounts, and said he should be happy to answer any question which any shareholder might put. (Cheers.)—Mr. TOWNE seconded the resolution.

Mr. HEDGCOCK said he thought there was not much probability of copper paying yet, and looking at the present prices, he thought it was better to leave the working of copper alone for the present. He asked what sort of ore they would get at the Gilbert and Chandiere Mine?—The CHAIRMAN: It is gold.

Mr. HEDGCOCK said he wished the company well. No doubt it was in great difficulties, but he believed the directors had taken as much pains as men possibly could have done. No doubt the great hope of success now lay in the tunnel. He should like to know how the directors were going to provide funds to go on with the company. The directors' fees were not large in themselves, but they were large considering the circumstances of the shareholders, and moreover were paid out of capital, as he did not see that anything had been earned. He should like the directors to come forward and say "We will not take any more fees until the mine turns out something good:" but, on the other hand, he would willingly give most ample remuneration to the board if something were coming to the shareholders.—A SHAREHOLDER, who said he came all the way from Rothwell to attend the meeting, said he had formerly bought shares at par, and had since bought others at a cheaper price to equalise them, and he would willing see the whole sold at 10*s.* per share. He was in 18 or 20 limited companies (a laugh), the prospectuses of which came from London, and were distributed through the provinces, and the poor benighted people in Scotland—(Oh! oh! and laughter)—took it all for gospel, and took the shares. He had paid dearly for his experience, and the shareholders also, and having paid so dearly for it they ought to be wise men. With regard to the Aberbeeg Colliery, he thought that some person or other connected with that before it came into the possession of the company ought to be prosecuted. (Hear, hear.) He had been in the Emma and one or two others, and such a set of scoundrels as he had met with in connection with them he had never known. He was not going to throw discredit upon the directors of this company, because no doubt they had had a very onerous duty to perform; but it was not use going on in this sort of way, and it was better for the shareholders to make up their minds what was to be done in this company. He not wish to say anything derogatory to the present board, but he certainly thought there ought to be some new blood put upon it. (Hear, hear.)

Mr. T. G. TAYLOR asked who introduced the Aberbeeg Collieries to the company, and also the Anguila Phosphate?—The CHAIRMAN replied at once that he had himself introduced the Aberbeeg, and he defied any man in this room, or in England, to dare to say that when that matter was laid before board it was not one of the most honest things he had ever seen in the course of his whole professional experience. He went down himself and saw it, and had never charged anything for expenses. He believed at the time that there was a chance of employing at 7 per cent. or 8 per cent. money of the company, which was only bringing in about 1 per cent., and judging from external appearance a better thing was never laid before people. How many men had been deceived over this affair? He took a man with him who was a professional man, whose expenses had been paid not by the company, and he said it was a fine property. In the report the directors said—"The case being, however, *sub judice*, the directors are advised not to give publicity to the details of the case, which will be brought to trial as fast as the legal formalities to be observed will admit." The company's solicitor would be able to state that when the case was before the Court they had the strongest evidence, and that every farthing would be recovered. He was going to say that the whole affair was a swindle, but he hesitated to say that, as it might be considered libellous. He himself had made five affidavits in the case, and there were 17 affidavits in all. The statement was made that there were 750,000 tons of coal; the coal had been worked just along the brim or edge, and the directors were assured that all the coal at the back was unworked coal, and the old workings were shut up for purposes of ventilation. So everybody was taken in. Now, someone must have known about it. Who was it? Well, the directors thought they had found out, and when the case came before the Court he had no doubt the directors would be fully able to substantiate their case.

Mr. T. G. TAYLOR went on to say that he had no faith in the Chaudiere property, but no doubt the directors had acted as a body for the best. He had been reproached with having originally recommended South Aurora. He thought they might yet the reach vein through the tunnel.

Mr. KLENCK thought the time had arrived when the company should be wound-up. (No, no.) He was sorry the Chairman should have been the means of introducing so many of these things to the company. This company had been made the dupe of other rotten concerns. He would speak what he felt, and his opinion was that nothing but wilful mismanagement could have brought the company into its present position, and he thought the directors would have done more service in being off the board than upon it.

A SHAREHOLDER asked for some information with regard to the water pipes?

Mr. HILL: You said you would recover the whole of the 500*l.* from the Aberbeeg Company. I thought that company was in liquidation.—The CHAIRMAN said that did not affect the matter; he would explain later on.

Mr. HILL asked whether the directors were also directors of any of the other companies to which money had been advanced?—The CHAIRMAN: Some of them, but we received no fees for it.—Mr. HILL: I suppose you take the position of trustees? He thought the great mistake the directors had made was in proposing too onerous terms for advances, and thus only companies in the lowest state of misery came to borrow money of them.—The CHAIRMAN: That is not so.—Mr. BERGTHEIL (director) said he had not intended to address the meeting, but after the observations which fell from the gentleman who came all the way from Scotland to attend this meeting, he would say a few words. They had heard that their worthy colleague—Mr. Gold—had resigned, and speaking for himself, he could only say that were he not in the mine he would not remain on the board, but he would not be a man to run away from a sinking ship, and, therefore, he stuck to it. (Hear, hear.) Since Mr. Gold's retirement the directors had tried to get another director, but had been unable to do so. Some remark had been made that the directors had shown a want of knowledge; well, the gentleman from Scotland had stated he had invested in over 20 limited companies, and he would ask had that gentleman under those circumstances shown much better judgment? (Hear, hear, and a laugh.) Another shareholder had talked about "wilful mismanagement" having brought the company into its present state. Now, what were the facts? He admitted that if the directors could have foreseen what was going on in the different companies most likely they would not have entered upon the enterprise; but it must be borne in mind that in two or three cases the enterprises before they were entered upon were actually submitted to the shareholders, and although there was some difference of opinion, the great majority followed in the same groove that the directors did. (Hear, hear.) He must say he could not conceive a more ungrateful situation than to be a director of a mining company such as this, but he had no wish to run away from the position when the company was in difficulty, but if the shareholders would turn him out he would be most thankful. There was the Corsican property, and one or two others, and he hoped means would be found to carry on the enterprise. If the shareholders wished to wind-up, by all means wind-up—(No, no)—or if they wished to put other men on the board he should be happy to resign.

A SHAREHOLDER asked how it happened that there was 400*l.* in the hands of Mr. Ford, the auditor?—Mr. KLENCH said he should move that a committee of three shareholders be appointed to confer with the directors, and report to a future meeting.—A SHAREHOLDER said he would second the resolution.

Mr. T. G. TAYLOR said that some of the shareholders might remember Cowper's poem of the "Needless Alarm," where the timid sheep, hearing frightful noises in

the distance, and fearing danger, consulted whether it would not be better to avoid it by jumping down the precipice and committing suicide. He disapproved of a committee because it would utterly destroy the company. The great hope of the company was in the tunnel which was being driven. They had gentlemen on the board of unimpeachable honour, and he hoped the shareholders would wait patiently and see the result of that tunnel.

A SHAREHOLDER suggested that instead of a committee being appointed the board should be strengthened, but without any increase of remuneration.

The CHAIRMAN said he would premise what few words he had to say in reply by remarking that they were all very wise after the event. He could quite understand the gentleman coming there and denouncing in almost unmeasured terms the policy of the board, though he would stake his existence that had that gentleman been upon the board at the time, however clever he might have been, he could not have altered it one iota for good or bad; every matter which was brought before the board was discussed most thoroughly, and not a single piece of business had been brought before the board in which the directors themselves were personally interested. It was time he introduced the Gilbert property, and if he had money to spare to-day he would put it into it. He believed if they had put 1000*l.* or 2000*l.* more into it they would have succeeded; but it was like commencing a house and not finishing it; unless they put the roof on they would not let the floors. Again it was true he introduced the Aberbeeg, with regard to which every possible judgment was used; he was very reluctant that the company should have that property, as a private client was ready to make an advance on the reports which were sent in by other gentlemen. As regarded the 400*l.* that was held by Mr. Ford as liquidator of the Anguilla Company, who would hand it over to the South Aurora as soon as certain forms had been observed. As regarded the reduction works, he would take it as a personal favour if Mr. Hedgcock would call at the office and, and give the directors the result of his experience with regard to copper, so that the board might better know what they were about. The directors did not want to put up reduction works unless they would pay.

In reply to a Shareholder, Mr. CADOGAN said that when the company was reformed it was found necessary, in order to simplify matters, to place the capital in the balance-sheet at 300,000*l.*

A SHAREHOLDER: Is any working going on at the South Aurora mill and mine?——The CHAIRMAN: No.——The SHAREHOLDER: There is a disbursement of 800*l.*——The CHAIRMAN said that was for wages, insurance, and taxes.——Mr. CADOGAN said the company was bound to pay a watchman 1*l.* a day, under the terms of the policy of insurance.

The CHAIRMAN said that Dr. Goodfellow was not paid, but had volunteered whilst in Nevada to do anything he could without charge. As regarded the Aberbeeg action, that would go on just the same, notwithstanding the liquidation, the Vice-Chancellor having refused an application which had been made to dismiss the action brought by this company. The action of the South Aurora Company was against the vendors of the Aberbeeg Collieries for misrepresentation. As regarded the current expenses, they were kept down to the lowest possible point. He believed that when they came to the deep in the tunnel they would find good ore, and the directors would have the advice of Capt. Drake, even if they did not have that gentleman's services. At present the assets were sufficient to carry on.

Mr. MAPPIN: You will never get any return from the Corsican property.——The CHAIRMAN said he thought Mr. Mappin was wrong on that point. As regarded the directors, it was not the value of the 100*l.* which he regarded, but he considered the labourer worthy of his hire, and he would not consent to act as director unless he were paid for it. There were really four companies to look after, and it often took three or four hours at a sitting, and the amount each director received did not really cover his expenses. As a rule the director who came in and acted without fees was the one who soon became the absentee member of the board. (Hear, hear.)

The SHAREHOLDER from Rothwell, referring to the suggestion for winding-up, said he thought that they should not cut down the tree for another year, but should dung it, and see if it would bring forth fruit. He only hoped the directors would succeed in making sweat some of those persons who had acted so dishonorably to the company.——Mr. KLENCH: 20,00 *l.* have been sunk in companies which the directors are personally connected with.——Mr. BERGTHEIL: I deny that *in toto*. (Cheers.)

The resolution for the adoption of the report and accounts was then put and carried.

On the motion of the CHAIRMAN, seconded by Mr. BERGTHEIL, Mr. Towne was re-elected a director.——Mr. James Ford was then re elected auditor, and his remuneration fixed at 10 guineas.

Mr. CLAY then moved that a committee of three shareholders be appointed to confer with the board, and report to a future meeting.——A SHAREHOLDER seconded the resolution.——Mr. BERGTHEIL said he believed this was the beginning of liquidation—the beginning of the end. The gentleman proposing the resolution had held his shares for six months, and possibly gave 2*s.* 6*d.* a piece for them When companies were struggling for existence it was customary for gentlemen to attend meetings and propose winding-up, and eat the little carcase.——Mr. KLENCK objected to this as a personal attack. He had given more for his shares than had been stated, and he had just found that one of his certificates bore the date of 1875. He had not proposed liquidation.——Mr. BERGTHEIL: But we know what it leads to.——The CHAIRMAN deprecated the movement as a slur upon the board.

A show of hands was then taken, when 13 hands were held up in favour of the resolution and 17 against it. The resolution was then declared lost.

On the motion of a SHAREHOLDER, seconded by Mr. KLENCK, a vote of thanks was passed to the Chairman, and the meeting broke up.

UNITED MEXICAN MINING COMPANY.

The ordinary half-yearly meeting of shareholders was held at the offices of the company, Great Winchester-street, on Wednesday,

Mr. JOHN WILLIAM WILLIAMSON in the chair.

Mr. W. M. BROWNE (the secretary) read the notice convening the meeting; the report of the directors was taken as read.

The CHAIRMAN said that ambition was a very laudable thing in its proper place, but certainly ambition had not placed him in the chair to-day—he occupied the position owing to the illness of two of his colleagues. It was the old story of the chairman having nothing to say which was not known to the proprietors; but that was not the fault of the directors, but rather in their favour, because the directors whenever information came gave it at once to the proprietors, and gave a *resumé* of the half-yearly report, which was now in the hands of the shareholders, and, as it was circulated a few days before the meeting, he took it for granted that everybody had read it. During the last year the old concern had made a profit of $1160. The year had been a bad one, and the state of Mexico had been very bad; but he was happy to say that by the last reports the revolution had terminated, and peace had been established. The company had had to pay a heavy tax of 1 per cent. on the capital; but, if peace were thoroughly established, he hoped they would not have to pay that again, at least to the same amount. The Mine of Rayas, which for many years was doing nothing, and which the directors had looked upon as hopeless, had during the year turned out favourably. Regarding that mine the directors in the report stated—"With the new year a marked improvement has taken place, and in the first two months the company received $4626 for their share of the profits." Rayas was not their property; but, according to the law of Mexico the company held the security of the mine for a debt. The debt owing by that mine was something like $200,000, and the mine if it continued to improve would soon put funds in the hands of the company, which, of course, would be a great benefit to it. The scarcity of ore in the hacienda or reduction works had been a drawback, owing to some of the mines in the neighbourhood having been in only partial work. As regarded the new concern, it was going on. Some time since the directors asked for a certain amount of capital to work the mine, and they were still progressing. Up to a certain point they were hampered by the difficulty of getting rid of the water, which was an expensive process, and also very tedious, but this had been obviated according to the latest report, so the expense of draining and pumping was got rid of. Some mines in the vicinity was reported as continuing to produce considerable quantities of ore, and to be making immediate profits. The Mexiamora Mine had taken some adjoining ground to work, and if that mine should advance and made a profit it was reasonable for the directors to suppose that this company's mine would do the same, and the report stated that the Mexiamora "have also denounced and obtained possession of new ground in the proximity of the company's property, therby showing their good opinion of the district, founded on actual experience." That showed the good opinion which the Mexiamora Company had of the property. With regard to the finances of the company, on March 26, the date of the last advices from the commissioner, the available funds amounted to $5141, and the value of the ore under reduction on Feb. 24 was $4340. The directors hoped to continue the investigation of the property; they had husbanded their resources to the best of their ability, and he was sure no objection could be taken to the way in which it had been spent. (Hear, hear.) Mr. Furber, the honorary consulting engineer, who had spent about 30 years in the district, and knew the mines intimately, still entertained sanguine views that there were—he would not say brilliant, but cheering—prospects for the company. The directors hoped to go on, and ultimately to come to a good "bonanza," and, if so, they would be glad to meet the shareholders and state that such was the fact. In conclusion, he (the Chairman) moved the adoption of the report and accounts.——Mr. GOLDSMID seconded the resolution.

Mr. MURRELL asked whether there was a profit of $1160 on the old concern after payment of all expenses?——The CHAIRMAN: Certainly, after debiting the old concern with all expenses there is a profit of $1160.

Mr. MURRELL asked whether that included interest upon money owing?——The CHAIRMAN informed Mr. Murrell, amidst considerable laughter, that the reverse was the case; the company did not owe money, but there was money owing to the company.

Mr. MURRELL wanted to know whether on the balance of the old and new accounts there was a profit?——The CHAIRMAN said there was not a profit, taking the old and new concern together. A certain sum of money had been advanced by the shareholders to be expended on the new concern, and the accounts of the two concerns were kept separately, though they were both worked by the company.

Mr. G. HARRIS (director): Profits that had been realised on the old concern had been expended on the new, to prevent calls being made.

The CHAIRMAN added that if the company were wound-up to-morrow there were no liabilities which the shareholders would be called upon to pay.

Mr. MURRELL: Are we in a better or worse financial position than 12 months ago?——The CHAIRMAN said they were decidedly in a better position as regarded finances, because the property had been developed to the extent that the shareholders had paid the calls, therefore there was more money in the mine. The explorations appeared to be favourable, and any morning a despatch to say that ore had been discovered might be received.

Mr. MURRELL, amidst loud laughter, inquired the marketable value of the property?——A SHAREHOLDER said Mr. Murrell would quickly find out if he offered his shares on the market.——The CHAIRMAN said the market price must not be taken to represent the value of the property; they must take into consideration the developments which had been made, and the present prospects of the mine.

Mr. MURRELL, amidst loud cries of "No, no," and interruptions, suggested whether it was not advisable to wind-up the company.

The CHAIRMAN said there was no ground for any shareholder to apply for a winding-up. Moreover, if the company were wound-up the shares which were now worth 2¼ would be worth nothing. (Hear, hear.)

A SHAREHOLDER said he thought, in justice to those shareholders who had paid their calls, that the 1777 unexchanged shares should be forfeited.

The CHAIRMAN said he thought the directors had not the power to forfeit them, but before they could be exchanged all arrears of call must be paid. His own impression was that the great bulk of those shares would never be exchanged.

The CHAIRMAN, in answer to a further remark, said that Mr. Furber continued to show his faith in the company by expending considerable sums in it.

The meeting was then made special, and a call of 2*s.* 6*d.* per share authorised, being the last 2*s.* 6*d.* of the 15*s.* which the directors were empowered some time ago to call up.——A vote of thanks to the Chairman closed the proceedings.

WHEAL CREBOR MINING COMPANY.

A general meeting of shareholders was held at the offices of the company, St. Michael's-alley, on Thursday,

Mr. J. Y. WATSON, F.G.S., in the chair.

Mr. C. B PARRY read the notice calling the meeting.

The SECRETARY also read the following report from the mine:—

May 9.—I beg to hand you my report of the above mine for the meeting which is appointed to be held to-morrow.—Since your last general meeting the winze then in course of sinking below the 108 has been holed to the 120, which has given good ventilation to both levels, so that we can now work the ore ground laid open at the 108 to good advantage. The winze below the 108 was sunk by the side of the lode with the object of effecting a communication with the 120 as soon as possible, consequently no lode was taken down in sinking from the 108 to the 120 Since a communication has been effected we have been cutting through the lode at the bottom of the winze, and have to-day reached the south wall, where the lode is 5 ft. wide, worth 15*l.* per fathom. We shall now begin to stope the back of the 120, west of the winze, and drive the 120 end, east of the winze, and after a few fathoms are driven we shall be able to set another stope, east of the winze, when we have every reason to expect a profitable piece of ore ground from there to the 108. The lode in the 108 east is large, but in the last 5 fathoms driving the south part has been poor; we have, therefore, been carrying only from 2 to 3 ft. of the north part, which has been worth about 8*l.* per fathom, but the latter part of last week it improved to 10*l.* per fathom. I am, however, sorry to say it has since fallen off, and is at the present time of no value. In the 72 east we are carrying from 2 to 3 ft. of the south part of the lode, which is composed chiefly of quartz, capel, and mundic. After we have driven this end a short distance further I propose cutting through the lode so as to ascertain its width and value. The lode in the 48 east is 9 ft. wide, 2 ft. of the north part of which is worth 6*l.* per fathom, but taking the lode for the whole width it looks very promising for a speedy improvement. The lode in the stope in the bottom of this 48 fm. level has fallen off in value, and at the present time will not pay for working. We have just commenced to sink a new shaft from the surface, about 200 fms. east of the engine-shaft This shaft will come down within a few fathoms of the present 48 end.—JOHN ANDREWS.

The CHAIRMAN read the report of the committee. The sales of copper since the last meeting realised 562*l.* 6*s.* 2*d.*, mundic 64*l.*, and they show a loss on the quarter of 156*l.* 15*s.* 8*d.* The statement of accounts shows assets over liabilities of 513*l.* 16*s.* 9*d.* At the mine the 108 and the 120 fm. levels had been communicated, and this will ventilate the levels, and open out ore ground for stoping, but the agent has omitted in his report to estimate the quantity of ore he expects to sell during the present quarter. The new shaft, in accordance with the terms of the lease, has been commenced 200 fms. east of the engine-shaft. It will be sunk on the course of the lode, and come down near the 48 end, where the lode is 8 to 9 ft. wide. He went on to say that the price for the last parcel of copper was very low; if they had got a better price for copper the loss would have been smaller. Now the 108 and the 120 had been communicated, the levels would be pushed forward into new ground, which would be vigorously and effectively developed by means of the new shaft which they had just commenced to sink. The committee look forward with great hope to the eastern ground. All they wanted was a better price for copper.

The report and account were then passed, and a vote of thanks having been accorded the Chairman the meeting broke up.

PARYS MOUNTAIN MINES COMPANY.

An extraordinary general meeting of shareholders was held at the offices of the company, St. Helen's-place, on Thursday, for the purpose of taking into consideration a proposal to dispose of the Morfadu portion of this company's sett to a new company for the purpose of working that portion of the propertv,

Mr. J. Y. WATSON, F.G.S., in the chair.

Mr. F. R. WILSON (the secretary) read the notice convening the meeting.

Mr. COOPER asked if there was any objection to asking whether the shareholder who had written a letter to the *Mining Journal*, setting forth a scheme by which the company might be successfully carried on, was present that day?——The SECRETARY said the writer of the letter (which was anonymous) was unknown to him, and he knew nothing of the letter till it appeared in the Journal.

The CHAIRMAN then read the directors' report, as follows:—

The directors have called this meeting, as you are aware, to consider the 'desirability of dividing the sett, and the sale of Morfadu to a separate company. The Morfadu rock is similar to that which covered the great open-cast before it yielded five millions profit, and has always been looked upon in the neighbourhood as a fine speculation in itself, but the Parys Mountain Company have not had sufficient capital to test it. When the bluestone at Morfadu was discovered an engine was erected to work it, and 150 tons raised and sold, but there was then no further demand. Now the directors have received offers for 3000 or 4000 tons a year, at a much higher price than that obtained for the 150 tons, and which would leave a good profit to the company. At present the Parys Company is crippled for want of funds—in fact, cannot be carried on much longer without them—and it seems to the directors that if the shareholders will assist in carrying out the plan now proposed two valuable properties may be worked to a success, and the whole of their large outlay be recovered. The directors are somewhat disappointed at not meeting with the expected lode in the 90 cross-cut south, but they would remind the shareholders that the great object of that cross cut is to get under the open cast, and the intersection of an intermediate lode is a secondary, though an important, object. Should this meeting approve of the plan proposed, or of any modified plan, the directors will enter into preliminary arrangements, and call another meeting to confirm.

The CHAIRMAN said he might add that Mr. Braby, one of the directors, and the holder of 1100 shares, who was not able to be present at the meeting, being on the Continent, had written to the board highly approving the scheme now submitted, and other proprietors, representing in all 4000 shares, had also expressed their approval of the proposal, and their willingness to take up their proportionate number of shares. To this general concurrence there was one exception—a gentleman, the holder of ten shares, had written objecting to the formation of a new company by the Parys Mountain shareholders, and suggesting that the public should be invited to subscribe the whole of the money required, and that the amount so raised should all go to this company. As to the desirability of carrying out the proposed scheme, and the manner in which the idea originated, he might mention that Capt. Mitchell had written to the directors stating the receipt of large orders from abroad for bluestone existing on the company's property, and asking whether it were possible to raise it, and fulfil those orders. Now, the directors had no money for raising this bluestone, nor was it in their power to obtain additional capital. Their manager had then suggested the idea of selling and working of the Morfadu property as a separate concern, whereupon he (the Chairman) had written the letter which had been referred to, in which he had suggested this, the only plan, in his opinion, calculated to accomplish the object in view. He had taken that action simply for the purpose of testing the feasibility of the scheme, and how far it would obtain their approval and support. It was quite evident that if something of the kind were not done the company could not continue. His stake in the company had cost something considerable, and he certainly desired to see the plan carried out if possible.

A SHAREHOLDER: What capital have we still?——The CHAIRMAN: Our capital is nearly exhausted. If this plan can be carried out we shall get additional capital, and have two mines instead of one. There are orders now waiting execution for 2000 to 3000 tons of bluestone per annum. About 150 tons could be raised monthly if we had the capital—this would require about 700*l.*

Capt. MITCHELL, replying to a question, said that the 4000*l.* proposed to be raised would take them well under the open-cast. This that they were engaged on was one of the grandest speculations in the kingdom. He had not the smallest doubt but that the intermediate lode of copper which they had been driving for for some time past was still before them, and did not for a moment think that the branches they had gone through were the lode split up. It was only a few months (six) since that the adjoining property (the Mona) had cut the very lode they were driving towards. In 3 fms. driving each way they were taking out 36 tons of ore. At one end the lode was 9 ft. wide. The Mona had gone through a period of trial and difficulty, but was now attaining a prosperous condition, and he believed the day was not far distant when the Parys Mountain would be paying equally well. In explaining the nature and extent of the property by plans Capt. Mitchell said the whole of it was too large for one company to work—there was room enough for two or three series of operations. The deposit of bluestone on the Morfadu was 5 to 6 ft. wide, and in places existed as a solid mass. In addition to the want of capital for working this portion of the property, they required money to open up the ground under the white rock. Last month the company raised 300 tons of copper, on which a good profit would have been realised had the price been equal to that ruling when the concern was started.

The CHAIRMAN stated that the company possessed 1000*l.* worth of yellow ochre lying ready for sale, waiting a market. The fact that all the company's accounts were paid up monthly necessitated a considerable amount of ready money to keep it going.——A SHAREHOLDER: What is about the average monthly loss?——The SECRETARY: About 150*l.*

The CHAIRMAN mentioned that during the last two months they had nearly paid their way so far as the copper mining operations were concerned. The 90 cross-cut to get under the open-cast had been costing the company a great deal of money for many years past. It was impossible to further reduce the works with the view of cutting down expenses, for they were obliged to have two engines going for the purpose of keeping the water out of the mine. With the exception of the 90 cross-cut they were doing none but paying work. There were some thousands of tons of halvans lying waiting for a market. All the necessary appliances were erected, and capable of dressing 500 tons per month, the moment the price of copper rose sufficiently to render the work profitable.

The CHAIRMAN, replying to questions, said there were in all about 22,000 shares; of this number the holders of 4000 had signified their readiness to accept and carry out the proposed scheme. The machinery at the mine had cost between 8000*l.* and 10,000*l.*; there would be, however, great difficulty in mortgaging the property, as apart from the general difficulty of raising money at all just now, bankers and others objected to advancing money on mines. The royalty was now 1-20th, having been reduced from 1-12th. The two proprietors had realised upwards of 5,000*l.* out of the opencast or cutting in past years. The water which came from the bottom of the opencast was of a dark claret colour, and eat up everything in the shape of iron that was put into it, thus clearly indicating the presence of copper. The water was drained off into precipitate pits, where it deposited a considerable precipitate of copper. When the company first started, and the price of copper was higher than now, they dressed the halvans and got 2*l.* per ton for them.

The SECRETARY, answering the remark of a PROPRIETOR, said no doubt some shareholders would refuse to subscribe for the new capital, but, on the other hand, it was very likely some would apply for more than their quota, which would thus balance matters.

After some further discussion, Capt. BALL moved, Mr. LUCAS seconded, and it was resolved unanimously—"That a separate company be formed for working Morfadu, in 13,000 shares of 1*l.* each, that 9000 be offered to present holders of Parys Mountain as 1*l.* per share payable by easy instalments, that 8000*l.* of this amount be working capital and 4000*l.* paid the Parys Mountain Company for the sett, and that 4500*l.* be bonus shares at the rate of one for every two subscribed for be given to those who take up the said 9000 shares."

The CHAIRMAN assured the meeting that no portion of the money subscribed would be applied to the purposes of the company without the sanction of the shareholders at a general meeting. The step taken that day was of a purely preliminary character, and another meeting would be convened (of which due notice would be given) for the purpose of carrying out the plan now suggested. (Hear, hear.)——The proceedings, with a vote of thanks to the Chairman, terminated.

PATELEY BRIDGE LEAD MINES AND SMELTING COMPANY.

An extraordinary general meeting of the shareholders was held at the offices of the company, Austinfriars, on Friday, May 4,

Mr. GEORGE BATTERS in the chair.

Mr. W. J. LAVINGTON (the secretary) read the notice convening the meeting.

The CHAIRMAN said the object of the meeting was not to create debentures, for that was done at the previous meeting, but that the shareholders should be satisfied of what was to be done with the money, if the money was raised, and what the prospects of good resulting from the use of the money raised. At the previous meeting the shareholders requested the directors, if possible, to get a report from Captain Williams, the manager of the Van Mines. Captain Williams was written to, and he wished to put off his visit for something like a month. His time was so much occupied that out of the many applications which he receives to inspect mines he is able only to inspect a few. However, after the consent of the directors had been obtained that he should visit the Pateley Bridge Mines, Captain Williams was prevailed upon to go at an earlier date than was at first anticipated, and his report had been obtained and circulated amongst the shareholders. He (the Chairman) would call the attention of the shareholders to the gist of this report. In it Captain Williams said—"It seems to me that you will never make a mine of it unless you sink an engine shaft from surface; and where should it be sunk so as to be most serviceable and command the whole mine with its several lodes?" He then went on to say, "A level called Eagle level has been driven towards your eastern boundary, in which they encountered a very strong stream of water, sufficient to drive a water-wheel. It is believed that this level drains the Sun vein, which to a certain extent has been proved, because the shaft upon Sun vein, near the end of the level, was sunk dry 30 fathoms below that level, and it was the want of sufficient ventilation to keep their candles alight that forced them to abandon it." Captain Williams recommended that the shaft should be sunk over the Sun vein, so as to give the ventilation to enable them to open the mine to a depth of some 60 fathoms. Since this report was written their own agent had written up to say that he was pleased to be able to inform the shareholders that the Sun vein, going east from the bottom of the new shaft under Gillfield level, was producing fine ore. This was the discovery which Capt. Williams wished to have made. Not only was the discovery made, but the man who probably knew more about the mine than any man living—Mr. Hutchinson—had confirmed Capt. Williams's recommendation. Mr. Hutchinson recommended that the trials should be pressed forward as rapidly as possible while the dry weather lasted, and then satisfactory results might be anticipated almost immediately. The proposition to sink a shaft over the shaft sunk by the old company in the Sun vein would be the means of carrying out the recommendation of many old miners, some now dead, who were desirous that this should be done, but were prevented owing to want of ventilation. By this means they would be able to drain the existing workings as well as the new workings. The Eagle level was 400 feet below the present workings, and it had been driven in limestone; and Mr. Hutchinson stated that the present forebreast showed no change. From this the fair inference was that the lodes so rich above would, if cut at so great a depth as 60 fms., give a mine second to none in England; and this was the opinion of Mr. Hutchinson. All that was required was to sink the shaft, and in the meantime to carry on the workings in the Sun vein and the other explorations which are now in progress, and there was every hope that satisfactory results would follow almost immediately. The letter from the agent, received that morning, stated—"I have nothing new to advise you of this week except that the Rake vein in the 30 fm. level east and west still continues to improve as we approach the course of ore that went down in advance of the forebreast, and we shall intersect the Lumb vein at another point in about a fortnight's time. We are breaking fine ore from the Sun vein going east from the bottom of new shaft under Gillfield level, the point from which the mine should be carried on as fast as circumstances will permit." The best point in Mr. Hutchinson's letter was that in which he said, "I shall be glad to subscribe for my proportion of debentures providing that these recommendations are carried out," because, as Mr. Hutchinson was the largest shareholder, his contribution would be the largest, and he knew more about the mine than probably anybody else. He (the Chairman) thought considerable weight should be attached to this letter. What he had to propose was that 5000*l.* of debentures should be created, and not only created but taken up. That would take them out of debt, and leave them upwards of 3000*l.* to carry on the operations at the mine—an amount which would carry them on for very nearly twelve months, even if no ore were raised. But there could be no reasonable doubt that a considerable quantity of ore would be raised during the next twelve months. The Sun vein was now worth 20*l.* per fathom, and all that was wanted there was to improve the ventilation and to carry on the trials with energy. They had spent so much money on the concern that it would be cowardlice to abandon it now when they were on the eve of success. All that was required was that the 5000*l.* of debentures should be taken up. It was proposed to issue them *pro rata* amongst the shareholders, and that they should carry interest at the rate of 10 per cent., with the option of conversion into shares.

A SHAREHOLDER asked what would be the price of the debentures.

The SECRETARY said they would be 5*l.* each, so that they could be converted into shares.——Mr. BAXTER: The subscribers will have the option of converting the debentures into shares.——The CHAIRMAN: Certainly, and a very valuable option it is. If they are not all taken up by the shareholders *pro rata*, the large shareholders will doubtless appropriate the remainder.

Mr. BAXTER said that Mr. Hutchinson fully endorsed the report of Capt. Williams, and recognised the importance of the recommendations he had made. In fact they were the recommendations he himself in conjunction with the agent had made all the way through. Capt. Williams expressed himself verbally much more in favour of the mine than he had done in his report. He was indeed very favourably impressed with the property, and thought it would be suicidal of the shareholders to hesitate for a moment in carrying out his recommendations. He said that if the shareholders prosecuted this mine, they had a valuable property before them, which would very soon develope into something good. He also was very favourably impressed with the mining characteristics of the district.

Dr. CHANDLER called attention to this paragraph in Capt. Williams' report, which he described as most damaging:—"I may here remark that those trials are only available so far as to prove the mine, as I am afraid you will cut into more water and be drowned out by your present pumping-engine having as much as it can do now." How could they get over that?——Mr. F. MANSELL: Simply in this way: they have had one of the wettest seasons experienced for many years, and having passed through that the engine is now working exceedingly well.

Mr. LAVINGTON pointed out that the part of the sett referred to was not the one where it was proposed to sink the new shaft. The latter was completely drained by the Eagle level, which was 400 ft. below the deepest workings in that part of the mine.

The CHAIRMAN said that they might be drowned out in winter, but not in summer; most of it was surface water, which percolated through the old workings. Capt Williams recommended a second engine, which he said would be quite ample to enable them to sink that shaft. Mr. Baxter and Mr. Mansell had been to see the mines, and could relate their experience. Mr. Baxter had already done so, but perhaps Mr. Mansell would add a few words.

Mr. F. MANSELL said he was very much interested in this mine, and he went down to see it. He had a long consultation, in company with Mr. Baxter, Mr. Hutchinson, and the manager. Capt. Williams, of the Van, told Mr. Hutchinson that the Pateley Mine at the present moment was equally as good as the Roman Gravels when he recommended the purchase of it, and he (the speaker) thought they gave 45,000*l.* for it. The points that were recommended by Capt. Williams were recommended by the company's manager some 18 months since—in fact, the former had but adopted the suggestions of the latter. If their present agent had had the management from the commencement he was quite certain that instead of asking for more money they would now be in a dividend position.

The CHAIRMAN said before the mine had come into its present hands it had paid dividends for 40 years; if this thing was not worth prosecuting then no mine was in the country.——Mr. F. MANSELL said he would take up his proportion, and so did several other shareholders in the meeting.

The CHAIRMAN said that the debentures would be issued by the directors forthwith.——Mr. BAXTER suggested that payments should be made as easy as possible.

The CHAIRMAN then moved—"That this meeting, having read Capt. Williams's report, and heard the explanations offered by Mr. Hutchinson confirmed by Mr. Baxter and Mr. Mansell, who have recently visited the mine, the directors be requested forthwith to issue 5000*l.* of debentures, bearing interest at 10 per cent., and allotted *pro rata* to the existing shareholders, and the present meeting pledges itself to subscribe for the same."

Mr. COMYN presumed that if any of the shares were left they would be offered to the public.——The CHAIRMAN said this would be done.——Mr. CARR seconded the motion, which was carried.

Mr. F. MANSELL bore testimony to the great zeal of the agent on the spot, and suggested the propriety of increasing his salary.——This hint was warmly taken up by the meeting, and the directors promised to take it into consideration.

Mr. BAXTER then proposed, and Mr. F. MANSELL seconded, a cordial vote of thanks to the agent, which was carried, and the proceedings then closed.

NERBUDDA COAL AND IRON COMPANY.—The general meeting of shareholders was held, on Tuesday, at the offices of the company, Finsbury-circus, when it was adjourned to a day to be named by the directors, of which due notice will be given to the shareholders.

For remainder of Meetings see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

It appears from official returns that the value of the coal imported into Belgium in the first three months of this year was 20,520*l.* less than in the corresponding period of 1876. The value of the coal exported from Belgium in the first three months of this year was also 151,800*l.* less than in the corresponding period of 1876. The value of the coke exported from Belgium in the first three months of this year was further 24,200*l.* less than in the corresponding period of 1876. There are no signs at present of an improvement in the Belgian coal situation; on the contrary, prices are still very low, important contracts are scarce, stocks are increasing, and the extraction is being reduced. A strike occurred a few days since at the Marihaye Colliery, but it was soon adjusted, and working operations have since been resumed.

The war does not appear to have exerted any stimulating influence upon the French coal trade. On the contrary, stagnation still prevails. In the Pas-de-Calais the prospects of the approaching summer season are not regarded as favourable. In the Nord the crop of beetroot is considered to have failed, so that the outlook of the beetroot sugar manufacture is not very encouraging. In the Loire the coal trade is quiet, but still it may be said to be better supported in this district than in other parts of France. It appears that the average cost of the coal consumed by the locomotives of the Orleans Railway last year was 17s. 1d. per ton, delivered on the tenders. It results from an official return that the production of coal last year in France amounted to 17,047,761 tons, as compared with 16,949,031 tons in 1875. The increase effected in the production last year was thus inconsiderable. While, however, the production of 1876 was 17,047,761 tons. the corresponding production in 1856 did not exceed 7,925,700 tons, so that great progress must be said to have been made by French coal mining during the last 20 years.

There is no improvement in the Belgian iron trade, either as regards pig or iron; the markets still remain without animation. Some success must be said, however, to have attended the efforts of certain Belgian firms to obtain orders abroad. Thus the Willebroeck Construction and Workshops Company has just secured a contract from the Dutch Government for 28 small iron road bridges of the aggregate weight of about 400 tons; these bridges are intended to be dispatched to Java. The same company has also obtained an order for the ironwork required in connection with sundry sheds proposed to be erected on the Roman Railway, as well as for several road bridges on the Upper Italy Railway. The total weight of these deliveries is about 260 tons. Experiments in connection with mechanical traction on tramways are about to be made at Brussels. Contracts for 8960 tons of steel rails are to be let at Bromberg on the 23rd inst.

A slight improvement is noted in the French iron trade; business has revived to a little extent, and a small current of orders has been noticed. Prices have been tolerably firm, even for pig. The Western of France Railway Company has let a contract for 1000 pairs of wheels with steel tyres. The question of the revision of treaties of commerce continues to occupy a large amount of attention in French industrial circles. The Cormaux Mines Company has been distributing 2*l.* per share, the balance of its dividend for 1876. The new Mediterranean Forges and Shipyards Company has been distributing a dividend of 1*l.* 4s. per share for 1876. In the course of the past year the Orleans Railway Company placed 29 new locomotives, with their tenders, upon its system; of these new locomotives 12 were passenger engines and the remainder were goods engines. Six locomotives and tenders were broken up last year, and were sold as old iron. The company's Aubin works produced last year 190,570 tons of coal, 28,709 tons of rails, and 815 tons of argentiferous lead. The company incurred some extraordinary outlay last year in erecting machinery for the manufacture of steel rails, and the profits realised for the year were only 16,046*l.*

The Dutch Tin Markets have been a little better supported, but the improvement established seems to be only due to purchases made on speculative account. Banca is still nearly 6 fl. cheaper than it was a year since. There has been a rather important advance in lead upon the St. Petersburg market. Chilian copper in bars has made 76*l.* per ton at Paris; ditto ordinary descriptions, 73*l.* per ton; ditto in ingots, 77*l.* per ton; English tough cake, 77*l.* per ton; and English best selected, 78*l.* per ton. Rolled Vieille Montagne zinc has been quoted at Paris at 30*l.* per ton.

FOREIGN MINES.

ST. JOHN DEL REY.—Telegram from Morro Velho, dated Rio de Janeiro, May 9: Produce for the month of April, 35,500 oits.=13,755*l.*; yield, 7 oits. per ton. All going on well.

RICHMOND CONSOLIDATED.—Telegram from the mine at Eureka, Nevada: Hall, London: 150 tons of ore smelted; furnaces produced $7000; refinery, $15,000. Ore in westerly drift improving. Hearing of suit postponed till July. [The directors were advised last week that the furnaces were all closed, but it appears by the telegram now received that smelting has partially recommenced.]

EBERHARDT AND AURORA.—Telegram: East side of old chamber four miners continuing breaking ore, looking favourable for considerably more, but amount uncertain. Income not specially changed. Made April 56 feet; total, 1158 ft. Still favourable, and drifting east 1100 level. Made tunnel 140 ft.; total, 1068 ft. All running well. Expenditure, April, 256*l.* Want May, 240*l.*

DON PEDRO.—Capt. Vivian, April 4: Mine—No. 8 Shoot: The disturbed ground here, caused by fissures, has been got through, and the lode is again well defined, large, and of good quality, especially in No 4 stope, where it is at least 14 ft. thick, and has a splendid appearance. No. 3 stope is also looking well.—Alice's West—No. 5 Shoot: In the rise westward from No. 2 stope we have taken some splendid samples, but it is impossible to say what quantity of ground there is standing here, the works being carried on so near the old excavations.—No. 6 Shoot: The stopes east are improved, but to no great extent. The stopes west are much the same as they have been for some time past—comparatively poor.

Mine captain, March 31: The ores extracted have been derived from the following places—Nos. 5, 6, and 8 shoots. General work has again improved, and is now what we term moderate. No boxwork available.—Stoping—No. 5 Shoot: The incline rise we toward from No. 2 stope has been carried on satisfactorily, and the lode here is of a fair quality. No. 3 stope being continued without change, also the north driving.—No. 6 Shoot: Nos. 2 and 3 stopes east have somewhat improved the last few days. In the western stopes no change being met with.—No. 8 Shoot: Sudden changes have taken place on this shoot in consequence of fissures which disturbed the lode. Since our last report Nos. 3 and 4 stopes have been advanced one set, and we are happy to state the lode has again become more defined. In No. 3 stope the lode is fair in quality, and in No. 4 stope the lode is very large, which embraces the northern part of No. 6 shoot above; the lode and branches are about 14 ft. thick, and what we term moderate. In the other stopes no change is being met with.—Prospective and Running Work: All works connected with the permanent pumping machinery are being carried on as fast as possible. The repairing of the 30 fathom level cross cut is being continued. The driving of the canoa at this horizon has become very hard for excavating. The repairing of Alice's level is being kept on, also the repairing of Vivian's shaft. In consequence of the heavy rain which found its way through the clay into the said shaft we are obliged to remove all old timber, and replace it with new from the horizon of Harris's cross-cut to the summit, a great deal of this work being done. The new driving from the adit level is being continued satisfactorily, and all other running work at the reduction department being kept on.

— Mine captain's letter, April 10: The ores extracted have been taken from Nos. 5 and 6 shoots at the horizon of Alice's, and No. 8 shoot in the bottom of the 35 fm. level horizon. The general work is of a fair standard. No boxwork available.—Stoping: The incline rise from No. 2 stope, in No. 5 shoot, is being continued satisfactorily; good samples are obtained, and general work from the same fair in quality. In the north driving and No. 3 stope no change is being met with.—No. 6 Shoot: Nos. 2 and 3 stopes east are suspended; they have approached near Alice's level. On the 9th another stope was commenced south of the vertical rise, and will be continued eastward. No change is being met with in the western stopes, which are still poor.—No. 8 Shoot—No. 3 Stope: The lode still continues to be large, and of a fair quality: the water has increased at this point, and we are sorry to state that very little more can be done before deeper drainage. In No. 4 stope the lode has again improved, and the general work is of a fair quality: the lode still remains large, and without any change in dip. In Nos. 5, 6, and 7 stopes very little has been done, therefore no change met with.—Drainage: The water drawn from the mine still amounts to 22·50 cubic feet per minute. The re-opening of the incline shaft is being continued. On the 6th we changed the small additional wire rope in Alice's level. The wheel was idle 55 minutes, and the water rose 14 ft. in the shaft, but not to hinder any work.—Prospective and Running Work: The repairing of Vivian's shaft is being kept on at intervals. The driving in the 30 cross cut, towards the canoa, still continues to be hard for excavating. The repairing of Alice's level is being kept on. The new level from the adit going towards Vivian's shaft is being carried on satisfactorily; we propose this driving to be continued on to the No. 6 shoot of the lode. A large pillar is being commenced at the horizon of the 35 for the security of the stopes in No. 8 shoot. In consequence of not having sufficient suitable quality timber to carry on the works connected with the permanent pumping machinery the progress is very slow.

— Telegram from Rio, dated May 9: Produce for the month (April), 3150 oits.

CONDES OF CHILL.—James Seccombe, March 26: Mines: There is no alteration to report, the lode continuing good at all points. I shall go down to Valparaiso to-morrow to meet the batch of miners that I have sent to Copiapo for. I hope to receive not less than 30 good men. I have set a contract for fixing the first section of the andarivels, which the contractor calculates upon having ready to work by the end of next month. I do not fear of being able to continue shipments, large or small, throughout the winter. I send you a box by this steamer containing two stones of ore, the large one from the bottom of Dawson's shaft, and the small one from the deepest point in the mine—Batters' shaft.

BLUE TENT.—D. T. Hughes, April 14: I am glad to be able to inform you that our water supply still holds favourable, and likely to continue considerably longer than the general anticipation. Although the showers that we have had for some time past have been very light, they nevertheless have been, in connection with much cloudy weather, sufficient to keep the stream well up in the river, so as to afford us a good supply for our ditch. So much cloudy weather has been the means of lowering the temperature of the atmosphere, preventing much evaporation and melting of the snow above too rapidly, and has had the most favourable effect in prolonging our water season so far. Washed in both claims this week as usual, and with fair success, with the exception of two days occupied at South Yuba in cleaning up, moving pipes, &c. I am very confident that our next clean up at South Yuba will be a favourable one, but probably not quite so good as the last. I have nothing further to report on either claims this week.

— Telegram from Mr. T. Price: Clean up, $7000. Details mail.

TOLIMA.—The directors have advices from their mines by the mail of May 9, of which the following is an abstract:—Frias: The February returns show a loss of 128*l.* 14s. 8¼d. The February report shows 23 fms. 5 ft. 4 in. of ground expended, of which 5 fms. 2 ft. 3 in. were unproductive, leaving 18 fms. 3 ft. 1 in. productive.—The general manager (March 20) says:—For the month of February the cost is higher than usual, owing principally to our having had to push some of the surface work to finish the whim wheel, which I am happy to say is now working regularly. The returns are not bad, considering the difficulties we have had to contend with, and show that if it were not for the unfortunate political state of the country, especially in this neighbourhood, we might be showing good profit on the working of the mine. The completion of the Alto Ditch to the seventh stream is also reported, but it appears that owing to crevices in the rock through which part of the aquaduct is cut a considerable leakage occurs. Steps to remedy this defect are being taken, meanwhile it is feared the present supply will be found inadequate to work the hydrant to advantage, but the manager states that even under the old style of washing good results will certainly be obtained.

I.X.L.—Lewis Chalmers, April 16: I enclose herewith the foreman's report. I shall try in the Exchequer mill a few tons of ore from the upper levels. I have got the rope, and am now ready to sink. Not having yet found our bonanza in the 200, I am cross-cutting to make sure we are not on either side of it. Mr. O'Hara promises me an estimate for a furnace in a few days. His complete success at the Exchequer justifies me in recommending you to adopt it. The chlorination went as high as 94 per cent. The following is the foreman's report:— "John Ryan, April 14: The mine is now well ventilated, and looking well throughout. The engine is running well, rope put on, and everything ready for sinking. The drain tunnel is looking well in the face and back in good ore 4½ ft. thick. A cross-cut has been started west from the north drift on the 200 ft. level to cut the ore body above named 200 ft. lower down. There are good indications of cutting the same far better in the 200 ft. level; the said cross-cut is now driven 10 ft., and in about 15 ft. more we expect to cut the ore. If so it will be an extensive and rich body of ore, and the I. X. L. will be amongst one of the leading mines at no distant day. The said tunnel is now 122 ft. from centre engine-shaft to face—good ore in the face, back, and bottom all the way; bigger and better quality in the bottom; 11 ft. driven this week: 28 car loads of ore taken out. There is considerable ore in sight in the old upper croppings, also in the north drift, some in the rise, and a good body in the drain tunnel. If not interrupted by sinking the main shaft would be able to furnish 20 tons of ore per day—will be able to furnish 10 tons anyhow, after repairing in the lower tunnel, preparatory to getting the ore from the upper, and a few more miners will be able to furnish the same. Everything in and about the mine is running and working well."

EXCHEQUER (Gold and Silver).—Lewis Chalmers, April 16: I enclose foreman's report for last week, or rather I should say interim foreman's report, foreman Redmond having left on Monday because I found fault with the ore sorting, and not yet having had time to get another:—"John Ryan, April 14: The new cable is put on, and is working well. The drift on the 400 ft. level is now 138 ft. from cross cut, to face in fine ledge matter, 7 ft. thick, and streaks of quartz carrying some ore. If indications are not false it will strike a paying body of ore on the 200 ft. level at no distant day. The drift on the 300 ft. level is now 350 ft. from shaft to face; started to stope out on said drift 165 ft. from face—said stope is looking well, is in 2 ft. of solid quartz carrying some good ore, and is likely to be a good shoot of ore soon. Stope No. 1, 2 0 ft. level, is now 30 ft. long and 7 ft. deep, and is in 2 ft. of solid quartz, 15 in. ore. Stope No. 2 is now 36 ft. long and 12 ft. deep; it is in solid quartz 4½ ft. thick, and is all pay ore by sorting it in the breast. Stope No. 1, 100 ft. level, is 57 ft. long and 6 ft. deep; it is in 2½ ft. of solid quartz carrying 1 ft. of pay ore. There is some good ore ahead in said stope, only it needs some timbering; it will be able to increase the yield of the 100 ft. level this week, and will be able to increase the yield of the whole mine as soon as the cage is running to the 400 and some timbering done on the 100, which will be done by Tuesday next. There have been 80 carloads of ore taken out this week. I am unable to give the exact account of the starting points for measurement, but am satisfied the usual amount of work has been done. Everything in and about the mine is running and working well. The Accacia tunnel cross-cut was driven 7 feet this week. I am running this now to cut the lode which is so promising on the top."

MALABAR.—G. B. O'Reilly, April 1: Mine: We finished cleaning up on the 26th ult., after running 559 hours, and obtained $2867·50 (say 570*l.*), which shows some improvement on our last run. It will be observed by the tabular statement enclosed that our amalgam is of a low percentage; this is due entirely to the extreme fineness of the particles of the gold which necessarily take up in the mass a larger peoportion of mercury than gold of a coarse grain. In order to obtain a fair idea of the value of the amalgam, and the produce in cash per hour run, the present run (No. 10) should be taken in connection with the former, the two operations representing a general clean up. The average will then be found to be—value of amalgam per oz., $5·57; produce per hour run, $4·44; a low result, due entirely to the poverty of the gravel hitherto encountered, which gives less than one-fifth of the proportion of gold found in the Malpaso Mine. We noticed some improvement in the appearance of the ground as we advance into the hill, and it is to be hoped that we shall find a corresponding increase in return in our coming run. We are now rather more than covering cost, and therefore our best course is to study economy and penetrate ahead as fast as possible, in the hope of getting into some better ground. I may observe, incidentally, that in our last three runs we have had no waste, and that during these runs our sluice has been kept full with all the stuff that 1600 in. of water could carry. To-day we shall probably have the water on again.

PESTARENA UNITED.—T. Roberts, May 2: We melted and consigned yesterday the gold for the past month. From Val Toppa district 190 ozs. 16 dwts. 6 grs. of gold obtained from 419 metric tons of ore; yield per ton 9 dwts. 2 grs. From the district of Pestarena 146 ozs. 18 dwts. 6 grs. from 177 metric tons of ore; yield per ton 16 dwts. 14 grs. Total obtained from both districts 337 ozs. 14 dwts. 12 grs. from 596 metric tons of ore amalgamated.

NEW BENSBERG.—C. Craze, May 7: We have commenced driving east and west of Victoria shaft, by six men at each end, our object being to push forward these points with all possible dispatch, and to gain north towards where we think the best part of the lode is standing. I am pleased to say that we have some lead in each of these ends, and to-day we broke some fine rocks of lead out of the eastern end, and they both present a most promising appearance for early improvement. The winze sinking below the 14 produces about 1½ ton of ore to the fathom, and presents a kindly appearance for continuing good in depth. The 14 east of shaft presents a better appearance, and to-day I broke some good lead ore out of the forebreast. The mine altogether has improved, and we have reason to believe that we soon be able to report something better than we have hitherto done. The engine is working well, and keeping the water under at about 13 strokes. All else going on well.

BUFFANY MINERALS (France).—John Edwards, May 4: The lode in the sump winze sinking below the 70 is 3½ ft. wide, worth from 80*l.* to 90*l.* per fm. for the length of sump—12 ft.; ground sunk during the past week, 1 ft. 6 in.; the sump is now sunk 5 ft. below the 70. The 70 north end is now extended 8 feet from sump shaft, and to-day we have just cut the south wall of the caunter lode, and hope to report its size and value next week. We have not taken down any of the main lode at this point during the past week, therefore the lode stands as reported last week, worth 40*l.* per fathom. The lode in the 70 end south, from sump, is 18 in. wide, worth about 2·5*l.* per fathom for silver-lead ore; this end is now extended 12 ft. from sump; ground driven during the past week—north end, 2 ft. 6 in., and south end, 2 ft. At the Bouxleres the engine shaft is now sunk 8 fms. below the 30 fm. level; the lode still maintains its size—fully 6 ft. wide—and carries good stones of silver lead ore; ground sunk during the past week, 2 ft. 6 in. We have not cleaned or dressed any ore during the week. All the machinery is in good order, and working very well. Ore raised since last report, 5 tons.

LUSITANIAN.—May 1: Palhal: Taylor's shaft is now within 1 fathom of the required depth for the 200 fm. levels, and the lode in the bottom maintains its richness, still yielding 5 tons of argentiferous copper ore per fathom. The 50 cross-cut, north of Perez' shaft, has gone through a head or wall, but it does not show any lode; the ground is very hard. In winze No. 108, below the 150 fathom level, west of Taylor's and west of the slide, the lode is 1½ foot wide, composed of quartz and stones of ore. The lode in winze No. 106, below the 28 fathom level, east of River shaft, is worth ¾ ton of ore per fathom, consisting of copper and cobalt ores. Winze No. 107, below the 180, west of Taylor's, is going down in a lode worth 1 ton of ore per fathom. The 190 west is producing 1 ton of ore per fathom. The lode is the 180, west of the slide, appears to be very disordered by a cross branch for the time. The lode in the 170, west of Taylor's, is 1½ ft. wide, composed of flookan and quartz; the quartz has increased since we have had the branch from the south. In the 150, west of slide, the lode is nearly 1 ft. wide, of quartz, and good stones of ore in the back of the end. In the 90, east of River shaft, the lode is 4 ft. wide, of quartz, lime, and spots of lead. In the 70, east of ditto, the lode is disordered, being a mixture of country and flookan. In the 50 east the lode is 4 ft. wide, composed of quartz and spots of ore. The lode in the 28 east is in two branches; the south one, upon which we are working, contains flookan, quartz, and spots of lead, and is letting out a little water.—Carvalhal: The lode in the 60, west of the cross-cut, south of Incline shaft, is small, but contains stones of mundic. The lode in the 30, north of the great lode, west of Incline shaft, is 1 ft. wide, composed of quartz, blende, lead, and mundic, not rich enough to value.

PONTGIBAUD.—W. H. Rickard, May 2: Monthly Report: Roure: The sinking of the engine-shaft below the 150 metre level continues steadily; the rock is still stiff and wet. The ground in the 100 cross cut east is very hard and spare for driving. The 80 metre level south is unproductive. The same level north is improved, now opening pretty good ground; worth about ⅓ ton of ore per current metre. The 60 metre level north, on Virginie's lode, yields ¾ ton of ore per current metre. The 40, in the same direction from Brugere's winze, yields average quality saving work. The adit level south of junction, on eastern split of Virginie's lode, yields ¾ ton of ore per current metre. We have cut a trip plat at the 20, at the Mill shaft, where we intend fixing a plunger-lift, and resume the sinking to the 40. Our stopes and tribute pitches throughout the mine maintain their yield. —Mioche: The adit and intermediate levels north continue in soft ground; the progress in driving is good, but the lode continues unproductive.—La Brousse: The 140 metre level, south of Basset's shaft, is in a large speedy lode, but unproductive. The 120 metre level in the same direction opens good ground, worth ¾ ton of ore per current metre. The lode where being undercut behind this end yields ¾ ton of ore per current metre. The 100 rise, under the air shaft, yields saving work; we hope to hole this rise to the shaft sinking below the 80 during the present month, which will ventilate the workings in this part of the mine thoroughly. The sinking of the new engine-shaft from surface goes on pretty well: the water is a little diminished, and the ground better. The 60 rise, under this shaft, goes on well, so also does the driving of the new adit level towards it. —Pranal: St. George's shaft has attained the necessary depth for the 110 metre level, the plat is set to be cut, but the rock lets out much water and gas, making the work difficult. The 90 south is suspended until the winze in advance of this points gets down to take off the pressure of gas, which will be in about two or three months; the lode in the winze yields ¾ ton of ore per metre. The driving of the 90 north will be resumed next month; the stope in the back yields 1 ton per current metre. The 70, north of St. George's, opens out good ground, worth 1¼ ton per current metre. The 70 south yields ¼ ton per current metre, and the 50 south ½ ton. The winze in the bottom of the 50 north yields ¼ ton per current metre.—Surface: The dressing has gone on well, and the samplings have amounted to 354 tons.

For remainder of Foreign Mines, see to day's Journal.]

TEXT BOOK OF MINERALOGY.

The generally recognised superiority of Dana's system of mineralogy as compared with any other described in the English language will suffice to secure a good reception for the "Text Book of Mineralogy,"* just completed by Mr. E. S. Dana, which has been specially prepared to meet the requirements of class instruction. It appears that the work was commenced by Prof. Dana immediately after the publication of the fifth edition of the "System of Mineralogy," but the state of his health compelled him to relinquish it, and he was not able subsequently to resume it; finally after a lapse of seven years the editorship was placed in the hands of Mr. E. S. Dana, who has very carefully adhered to the original plan. Being intended for class use, the descriptive part has been made subordinate to the more important subjects embraced under Physical Mineralogy. Naumann's method of crystallography is followed as being most easily understood by the beginner, and most convenient for giving a general knowledge of the principles of the science, but Miller's system is fully explained in an appendix. The chapter on the physical characters of minerals has been much extended, and the descriptive part of the volume is an abridgement of the "System of Mineralogy." A considerable number of changes and additions, however, have been made in the preparation of the present work, made necessary by the progress in the science, and among these are included many new species. The work has throughout been under the supervision of Prof. Dana, and all the proofs have passed under his eye, so that its utility as an introduction to the larger work cannot be doubted.

In the first section—crystallography—the general character of crystals are described, and some of their simpler forms explained, and there is then an account of the systems of crystallisation. The laws with reference to the planes of crystals are next explained, and then the several systems—isometric, tetragonal, hexagonal, orthorhombic, monoclinic, and triclinic—are treated of. The section on mathematical crystallography is followed by observations on the irregularities of crystals, in which it is remarked that the laws of crystallisation when unmodified by extrinsic causes should produce forms of exact symmetry, the angles being not only equal but also the homologous faces of crystals and the dimensions in the directions of like axes. This symmetry is, however, so uncommon that it can hardly be considered other than an ideal perfection. Crystals are very generally distorted, and often the fundamental forms are so completely disguised that an intimate familiarity with the possible irregularities is required in order to unravel their complexities; even the angles may occasionally vary rather widely. Again, referring to pseudomorphous crystals, it is explained that every true mineral species has, when crystallised, a form peculiar to itself. Occasionally, however, crystals are found that have the form both as to angles and general habit of a certain species, and yet differ from it entirely in chemical composition. Moreover, it is often seen that, though in outward form complete crystals, in internal structure they are granular and waxy, and have no regular cleavage. Such crystals are called pseudomorphs, and their existence is explained by the assumption, often admitting of direct proof, that the original mineral has been changed into a new compound, or has disappeared through some agency, and its place taken by another chemical compound to which the form does not belong.

The physical characters of minerals are treated of in the second section, and chemical mineralogy is then dealt with in a couple of dozen pages. In this way the reader is well prepared for the third part of the volume, treating of descriptive mineralogy, which is particularly lucid and complete. A synopsis of Miller's System of Crystallography is given as an appendix, and there is also a valuable chapter on the drawing of figures of crystals, and a well-arranged series of tables to be used in the determination of minerals; the remaining appendix comprising a catalogue of American localities of minerals. The work is of great value, and in every respect calculated to make the student a thorough master of the subject. The printing could scarcely be better, whilst it is illustrated with more than 800 woodcuts and one coloured plate, so that whatever information may be desired will be readily and satisfactorily obtained from Mr. Dana's text book.

THE WHITWORTH MEASURING MACHINE.

There is probably nothing which has done so much to facilitate the progress of mechanical construction as the introduction of machine tools, for which Manchester is undoubtedly entitled to the honour, and for ascertaining the accuracy of the work done with them there is, perhaps, no instrument of precision the importance of which surpasses the Whitworth measuring machine, the description of which is given in a handsome little quarto volume by Professors Goodeve and Shelley.† They remark that the efficiency of a machine when completed may depend so largely on the truth of the surfaces of the moving parts that it becomes of the highest importance to eliminate as far as may be possible any errors which might detract from that extreme accuracy of movement which alone can produce successful results. The two principal surfaces of essential importance in the workshop may be distinguished as a true plane and a true cylinder, "true" being in these expressions an ideal conception which, like any other perfect thing, may be striven for but cannot be attained. The nearest approach to it is probably the surface of clean mercury when at rest, and hence it has become a common thing to regard the polish of any artificial surface as a test of its truth. But the idea of the necessity of polish must be abandoned altogether when considering a metallic plane surface as aimed at and constructed for the use of the mechanician. The approximate true plane, which is of so much value in the workship, has no polish at all; it is mottled throughout by the action of the scraping tool which has operated on it, and is to be regarded as true not in the optical sense of being a correct reflector, but in the mechanical sense of being a vast assemblage of minute bearing surfaces evenly distributed, and approaching closely to one geometrical bounding plane. Such an approximate plane when formed in iron, and coated with a film of silver, may receive a high degree of polish, and will then approach the truth of the surface of still mercury, with the advantage of being capable of being supported at an inclination to the horizon. They suggest that the astronomers of the next generation may possibly appreciate the value of this extended use of the mechanician's primary surface.

The condition which a true plane or surface plate should fulfil are that the bearing surfaces should all lie in the same plane, that they should be distributed as nearly as possible at equal distances from each other, and that they should be sufficiently numerous for the particular application intended. It is shown that these surface plates are made so true that when one is wiped with a dry cloth and laid upon another the upper plate will appear to float and become buoyant as if some lubricating matter existed between them, and the effect has been attributed to the presence of a film of air between the surfaces which it was said relieved the friction so completely that they would move with a touch. If the upper plate be slightly raised and allowed to fall there will be no metallic ring, but the blow emits a peculiar muffled sound, due as believed to the presence of a cushion of air. The most minute experiments with glass plates showed that though in such close mechanical contact the plates were by no means in optical contact, being separated by distances capable of embracing several wave lengths of the monochromatic light. It was also noticed that the amount of vacuum formed in the receiver of an ordinary air-pump has little or no power in diminishing the floating effect which is observed when one plate lies upon the other. The floating is just as apparent under the exhausted receiver as in the open air. The explanation of this fact is not very obvious, but it is generally considered that the adhesion is caused by molecular attraction.

The mode of constructing other true planes from the standard is explained. It is shown that the Standards Commission, with all their efforts at accuracy, differed to the extent of 1·50,000th of an inch in making their comparison of two standards—a magnitude which a skilled workman supplied with a bench measuring machine would detect in a moment when required to apply end measurement to a standard bar. The descriptions of Whitworth's millionth measuring machine, which secures accuracy to the one-millionth of an inch; of his microscope apparatus for the comparison of bars; and of his workshop measuring machine, which secures accuracy to 1·50,000th of an inch, are in turn given, and the details and methods of manipulating are fully illustrated. Perhaps the only cause for regret is that so much pains should have been taken in connection with a decimal system without at once adopting the metric system, to which, at no distant period, the antiquated and absurd system in use in England and America, but already abolished by Germany, Spain, Italy, Belgium, and most other countries which formerly used them; but it may be hoped the importance of accuracy having been recognised, the adoption of the more concise and intelligible nomenclature of the metric system will also be adopted. The volume is altogether very interesting, and from the extreme clearness of the engravings and woodcuts with which it is illustrated the accurate comprehension of the whole subject is ensured.

It is gratifying to us to be enabled to announce another instance of the wisdom of changing the system of mining in this county, the tunnel having been generally discarded for the shaft. The sinking of shafts have made the Exchequer and I.X.L., at Silver Mountain, paying mines, and we now have to chronicle an important strike in the Advance Mine, at Monitor. The west drift of the Advance at the 320 ft. level, running towards the prospecting shaft in ledge No. 3, has penetrated ledge No. 2 72 ft., and not yet reached the footwall.—THE EXCHEQUER.—Stoping is going on in levels Nos. 1 and 2, and drifting in levels Nos. 3 and 4. The mine is looking well throughout, and is shipping its usual quota of ore to the mill. As there will be much heavy hauling over the road between the town and the Exchequer mill, manager Chalmers is having it put in the very best order for the season. Grading for a Mammoth barn for the Exchequer mill teams is progressing at the mill. The Exchequer mill is running steadily and satisfactorily, and we regret that we are not able to publish the amount of bullion from the late cleaning up, Manager Chalmers deeming it proper to notify his company at the home office in London before giving publicity to it here. We feel that we can assure our good people that all is well.—ACCACIA: We hope to give good news from this mine before long. A cross-cut is being run from the lode.—*Alpine Chronicle*, April 14.

* "A Text Book of Mineralogy: With an Extended Treatise on Crystallography and Physical Mineralogy." By EDWARD SALISBURY DANA, Curator of Mineralogy Yale College. On the plan and with the co-operation of Professor James D. Dana. New York: John Wiley and Sons. London: Trübner and Co.

† "The Whitworth Measuring Machine, including descriptions of the Surface Plates, Guages, and other measuring instruments made by Sir Joseph Whitworth, Bart." By T. M. GOODEVE, M.A., lecturer on applied mechanics, Royal School of Mines; and C. P. B. SHELLEY, professor of manufacturing art and machinery, King's College. London: Longmans and Co., Paternoster-row.

CUTTING AND DRESSING STONE.

There can be little doubt that stone would be much more largely used for constructive purposes but for the heavy cost of fashioning it, for it frequently happens that a sound stone that could be delivered at 7d. or 8d. per cubic foot is found to cost by the time it is in place and finished in the building 2s. per cubic foot, or even more. This arises from two causes; in the first place it is well known that by bringing the unwrought stone to the place of erection the cost of carriage has to be paid upon the stone which is cut to waste, as well as upon that which is usefully employed. This difference not unfrequently amounts to 40 per cent., and often to even more. Now, it will be evident that if the cost of carriage were 16s. per ton the difference would amount to about 1s. per cubic foot of finished stone, often sufficient to prevent the use of stone altogether. By dressing at the quarry the utmost economy is obtained, and only the mere artistic finishing need be done at the place of erection. Many stone-dressing machines have from time to time been introduced, and some of them have worked very successfully, yet it is very generally acknowledged that there is much room for improvement.

Some six months since a very promising invention was introduced by Mr. J. B. WEIR, of Glasgow, and many well able to form an opinion consider it likely to prove a great success. He makes use of machines constructed on principles similar to machines for iron planing, rubbling, and slotting, which machines are to be of various sizes, according to the stones to be dressed. They are intended to be fixed upon sound stone, wood, or other foundation of sufficient solidity to prevent vibration as far as possible, and are intended to be driven by belts, shafting, and pulleys or other gearing. The stones to be cut, hewn, and dressed are intended to be placed and fixed firmly into and upon such machines by screws, keys, wedges, and other necessary appliances in such positions that the invention may be used to cut, hew, and dress such stones upon either one or more faces and into such shapes, patterns, and forms as may be necessary and requisite. Mr. Weir's invention also consists in the use of steel and iron tubes, or circular pipes composed of steel or iron of equal diameters in the course of their entire lengths, varying from ¼ in. to 12 in. in diameter, and in lengths of from ¼ in. to 40 ft., to be tempered and (or) casehardened to such degree or degrees as the nature or hardness of the stones to be cut may require; these tubes are to be placed and fixed into sockets, and so fixed in horizontal, vertical, angled, and inclined positions, or into one or more of these positions, according to the nature of the work required to be done, and in such numbers and sizes as will be necessary for the proper cutting, hewing, dressing, and ornamenting of the stones; these tubes will be so fixed in the socket or sockets as at times to be immovable, and at other times to enable them to evolve, and being also capable of being shifted backwards or forwards, or partially so, or changed to a proper position in other respect as the work progresses; these tubes will also be so fixed as to enable them to revolve upon ordinary or self-acting spindles.

The working of the tubes and spindles when revolving are to be regulated and driven or worked by a self-acting motion or a combination of spur or other wheels of various sizes, and a similar motion when immovable. The sockets to which the tubes or spindles are to be attached are intended to be made of cast metal, and of such different sizes, dimensions, and designs as will be adaptable to the proper fixing of the various sizes of the tubes or circular piping and spindles thereto, and in such numbers as may be required, according to the description of the work necessary to be performed, and the hardness and softness of the stones to be operated upon. All the stones to be cut and dressed, both plain and ornamental, are to be so cut by the action of the ends of the tubes working upon the faces of the stones, combined with the working of the other portions of the machinery already described, this particular portion of the machinery being intended to be wrought in a manner similar, or nearly so, to that of the working of an ordinary iron planeing machine, and by the means described.

TREATING SPENT OXIDE OF IRON TO OBTAIN SULPHUR AND PRUSSIAN BLUE.

The spent compounds of iron which have been used in the purification of illuminating gas contain often 40 per cent. and more of precipitated sulphur, which has heretofore been employed for the manufacture of sulphuric acid, by burning it directly to sulphurous acid; and it has also been extracted from the spent oxide by means of carbon bi-sulphide and by distilling off the latter and recovering the sulphur itself. The method invented by Mr. G. T. GERLACH, Ph. D., of Kalk, near Colonge, for recovering the sulphur consists in heating this spent oxide in retorts of iron or clay (for instance, retorts which are used in the manufacture of illuminating gas) and in distilling off this sulphur, while at the same time superheated steam is introduced. Without employing superheated steam the vapours of the sulphur evaporate slowly, whilst by employing superheated steam the distillation of the sulphur is quick, and the sulphur evaporates very easily. Whilst in closed steam-boilers the steam pressure is augmented in the same proportions as the temperature is raised; superheated steam can be furnished of any desired temperature without any tension or pressure. By superheated steam the temperature is quite independent of its tension. If common steam is let through iron pipes heated to red heat the steam leaves the said pipes having the same temperature as the red-hot iron. Such superheated steam is invisible, and is exactly like a gas. In a current of such superheated steam wood and paper become brown, and sealing-wax, and even lead and tin are melted.

To recover the sulphur and Prussian blue, or prussiate of potash, the humid material is, according to Dr. Gerlach's process, ground in a mill to form a fine mass, which is lixiviated by means of water. If the mass contains ammoniac in a free state the lye can be neutralised by an acid. By this lixivtion the soluble ammoniac salts are obtained, which are by evaporation crystallised or employed in the usual manner by any suitable copper salt for the precipitation of sulpho-cyanite of copper or distilled with lime to obtain volatile ammoniac. Water is again poured on the lixiviated mass, and simultaneously caust c soda or carbonate of soda or lime is added to the mass. Already by the cold digestion with such such alkalis the insoluble prussiates are converted into soluble prussiates. The clear liquid is drawn off and treated with an acid until the same is neutralised or gives a weak acid reaction. The weak acidified liquid is soon clouded by precipitated prussiates and sulphur. This dirty green precipitate might afterwards injure the beautiful clear colour of the Prussian blue, and is, therefore, carefully removed. The clear solution, which if necessary is filtered, is then acidified and treated by a solution of perchloride of iron, or by a small surplus of any other soluble salt of oxide of iron, such as sesqui-chloride of iron. He thus obtains Prussian blue, which in consequence of its purity has a dark blue colour, and when dried shows a copper lustre on its fractures. He employs this product as Prussian blue itself, or converts it into prussiate of potash.

For the manufacture of prussiate of potash the spent oxide has hitherto been treated directly by caustic potash or by carbonate of potash, and the lye has been evaporated; or the lime containing spent oxide has been treated with carbonate of potash, and after filtering off the carbonate of lime the lye has been evaporated. In both cases great masses of diluted lye have to be treated, and there is danger of producing a decomposition of the prussiate of potash. These lyes contain always also sulpho-cyanide of potash, which is to be found again as a contamination in the prussiate of potash. Consequently he prefers to precipitate the acidified solution by sesqui-chloride of iron to wash out the Prussian blue and to obtain by this washed Prussian blue the yellow prussiate of potash by any known manner. The spent oxide of iron lixiviated in this manner contains a great quantity of sulphur in a free state. The mass is dried and then, as above described, distilled for recovering the sulphur. During this distillation superheated steam is led over the heated mass, by which means the sulphur to be recovered is distilled off in a very short time.

The essential feature of Dr. Gerlach's process, as compared with those heretofore used, is that he does not employ any solvent for the sulphur, but distils off the sulphur together with steam. In the same manner the sulphur is recovered from the gas lime, if lime in place of iron is used for desulphurating the illuminating gas, and in the like manner this method can be employed for the recovery of sulphur from any other masses or ores containing sulphur. The lixiviated and desulphurated massa is heated whilst air is admitted, and the product is a beautiful brown colouring mass, *caput mortuum*, which can be employed as a paint. If the sulphur only is to be recovered from the spent oxide, and if the recovery of the cyanides is dispensed with, it is advisable to dispense with the crushing or pulverising of the spent oxide in a mill. The desulphuated masses can be used anew for the purification of the illuminating gas.

BLAST-FURNACES, AND BLAST-FURNACE GASES.

The invention of Mr. D. G. HOEY, of Workington, relates, first, to the utilisation of the waste gases of blast-furnaces, for the purpose of heating the stoves and boilers employed in connection therewith, and consists in providing means for causing the said gases to be mixed with air, which air, according to his invention, is introduced into the interior of the furnace through perforations in the platform at the top of the furnace, the said perforations entering the furnace above or near to the level of the charge, or through such perforations in the body of the furnace itself below the tunnel head, and in like manner entering the furnace above or near to the level of the charge, or through tubes, pipes, or flues, conducting the said air into the interior of the furnace above or near to the level of the charge, or through perforations provided in the tunnel head or in the charging doors, the said air being supplied from the blast-engine by means of a tube, pipe, or flue, or where suitable by the said perforations, and others being left open at the outer end to the external atmosphere. The tunnel head to be closed at the top by means of a damper of any suitable construction. The gases after having been acted upon by the air are conducted in an ignited condition to the stoves and boilers by means of a tube, pipe, or flue, provided with dampers where necessary for regulating and directing the passage of the said gases.

The invention relates, secondly, to an improved mode of maintaining the lower outer portion of a blast-furnace cool, and for conducting the vapour arising from the cooling medium away from the tuyere rooms. According to this part of his invention he provides around the lower portion of the furnace a jacket, forming a chamber below the level of the tuyers, in which chamber there is arranged a perforated tube, or series of perforated tubes, through which water is caused to flow and pass through the perforations on to or against the exterior of the lower portion of the furnace, down which it flows continuously. The vapour from the water is carried away from the chamber by means of a pipe or pipes, which conduct it into the atmosphere above the tuyere rooms. He also proposes to cool the space immediately surrounding the tuyeres, when necessary or desirable, by providing at that part a pair of hollow shutters or chambers containing a perforated tube or perforated tubes, through which water is caused to flow and pass through perforations, as before described, on to the interior of the shutters when closed against the surface surrounding the tuyers, thereby maintaining it cool at that part, the vapour arising from the water being carried away by means of a pipe or pipes in the same manner to that before described with reference to the other cooling chamber.

The invention relates, thirdly, to means for drying the air in its passage from the blast-engine through the receiver into the stoves, by causing such air before entering the stoves to pass over or in contact with a layer or layers of chloride of calcium or other suitable substance or substances containing absorbent properties, or the absorbent materials may be suspended or arranged in any other convenient manner.

BOILER TUBE BEADER.—A handy tool, small in size, and which can be used with but little exertion, whilst it has the advantage of doing six times the amount of work that can be done by hand, has been invented by Mr. D. L. SELKIRK, of London-street, and is found in practice to make a perfect and well-finished bead. The part of Mr. Selkirk's tool which has to be inserted in the tube is circular in form externally, and conical internally. It has four recesses cut in it to receive four pieces grooved externally, to grip the inside of the tube, which may be tightened or slackened as may be required by the conical centre piece which extends outwards beyond the tool, and has a hexagon nut for tightening or slackening purposes. Over this centre piece is fitted a ratchet, which has in front three turned rollers, hollowed out so as to form the bead on the tube end. After the four grooved pieces have been tightened in the tube by screwing on the cone, the rollers are pressed against the tube end by a feed screw, and the ratchet worked in the ordinary way, and in this manner the bead is formed on the tube end. The new beader is considered by the mechanics who have used it to be well adapted for the purpose for which it is intended, and will, no doubt, come largely into use in all shops where tubular boilers are manufactured.

LUBRICATING COLLIERY WAGONS.

The under frame for carrying the tub body is, according to the invention of Mr. HENRY JOHNSON, of Dudley, which was provisionally specified, but the patent was not secured, formed out of a wrought-iron plate so as to make the under frame self-contained and separate from the body, so that when the body becomes worn out it may be removed and replaced by a new one. At each end of the wrought-iron plate five langets are formed; the central ones in each case are turned up to receive the rings for hauling the tub, and the other ones are turned up round the buffers, which are secured to the tub body by means of bolts passing through the lagnets and buffers into the body. The lubricators or brackets for the axles of the wheels to work in are cast with a recess in the top for the under frame to drop into so as to keep the axles perfectly lineable and square. The lubricators, brackets, or axle bearings are cast with a closed top, and have each a round hole at the bottom for the oil or grease to run through on to the axle, such hole having a needle to work up and down as the tub is turned over to keep the hole clear. The grease box of the lubricator is fed through a hole on the inside, which is kept closed by a screw plug; thus these lubricators are pneumatic. There is a collar cast on the inner side of this bracket, and such collar is made to work into a collar cast on the wheel and hollowed out for more perfectly conveying the oil from the lubricator through the wheel. He also employs a buffer consisting of a short cast-iron nozzle, wider at one end than the other, and a flange with holes in to bolt it on to the tub body. A piece of round wood conical in section is fitted inside this nozzle projecting beyond its smaller diameter, the other end being level with the larger diameter; a wrought-iron plate is placed at the back, and the whole is bolted through the flange and the wrought-iron plate on to the body of the tub.

Another invention relating to colliery tubs has been provisionally specified, but not patented, by Mr SAMUEL WOODALL, of Windmill End Works, Dudley. The special objects of the invention are the prevention of waste of the grease, oil, or lubricating materiel; the effecting a considerable saving of time and labour in supplying the lubricating material to the wheels, and the ensuring that the entire bearing surface of the wheels and axles shall be effectively lubricated. In carrying his invention into practice he casts between any two spokes of the wheel a box or receptacle for the lubricating material. In using oil as the lubricant he supplys it to the box through a tapped side hole, which is afterwards closed by a screw pin, the oil obtaining access to the said bearing surface through a hole made through the boss of the wheel, a pin working losely in the hole and preventing the too rapid passage of the oil. In using grease as the lubricant he supplys it to the box (which he makes of a less height than when using oil) through an opening in the top, which is then closed by a piece of narrow hoop iron, curved to work in grooves cast on opposite sides of the opening of the box, the grease obtaining access to the said bearing surface through a small passage made through the boss of the wheel, The axles on which these wheels work are made fast to the buffers or feet by a staple bolt encircling the lower side of the axle, and going up through the buffer and bottom plate of the tub, where it is secured by two nuts. The axle is prevented from wearing into the buffer by a small wrought-iron bearing plate kept in position by the staple bolt. Either the wheel only or this attachment of axle may be fitted to the wagons separately, The advantages gained by adopting this attachment are that the usual cast-iron pedestal is not required, and the amount of friction is considerably reduced.

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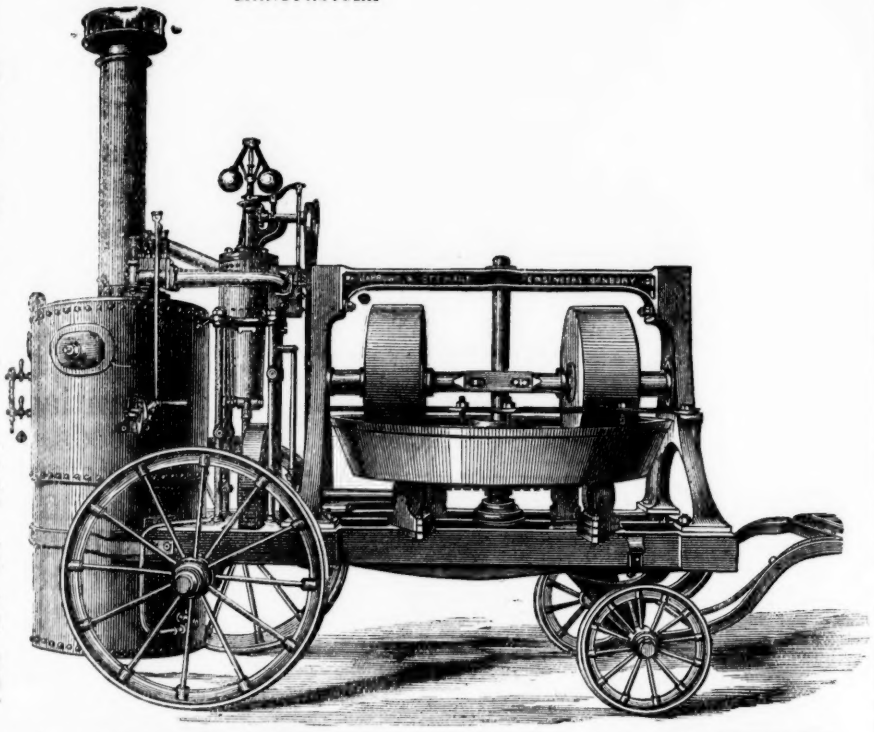

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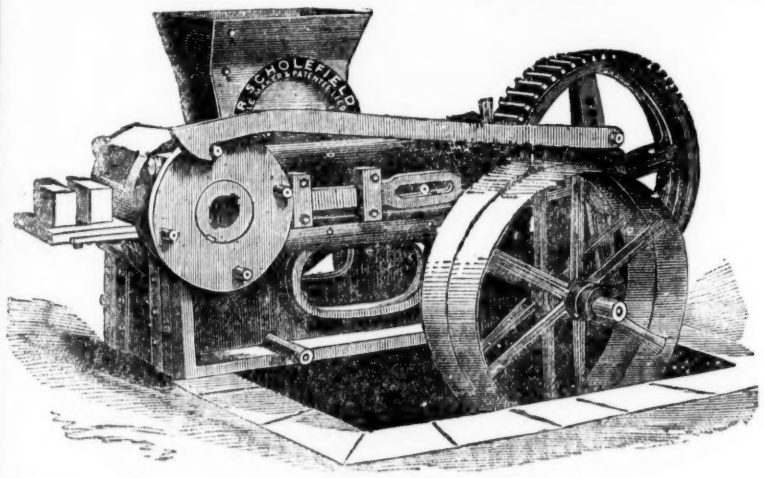

R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless), is at once made into bricks, at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	£0 8 0
1 man grinding, 4s. 6d. per day	0 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0 2 0
1 boy greasing, 1s. 6d. per day	0 1 6
1 engine-man, 5s. per day	0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	0 4 0
Total cost of making 10,000 pressed bricks	£1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.

As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

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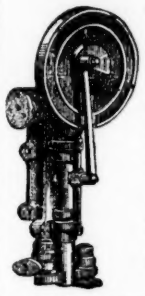

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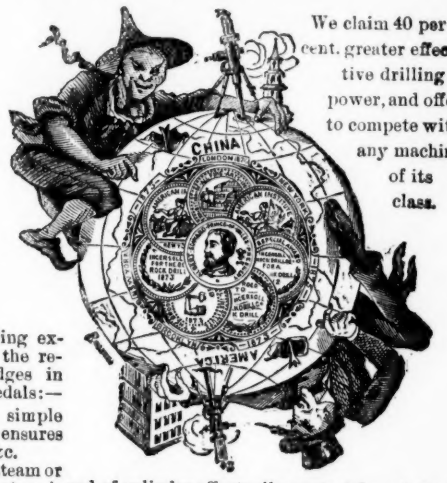

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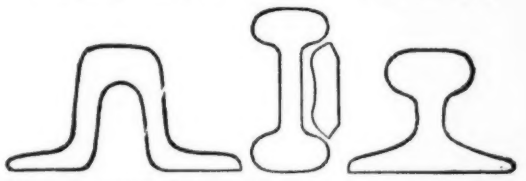

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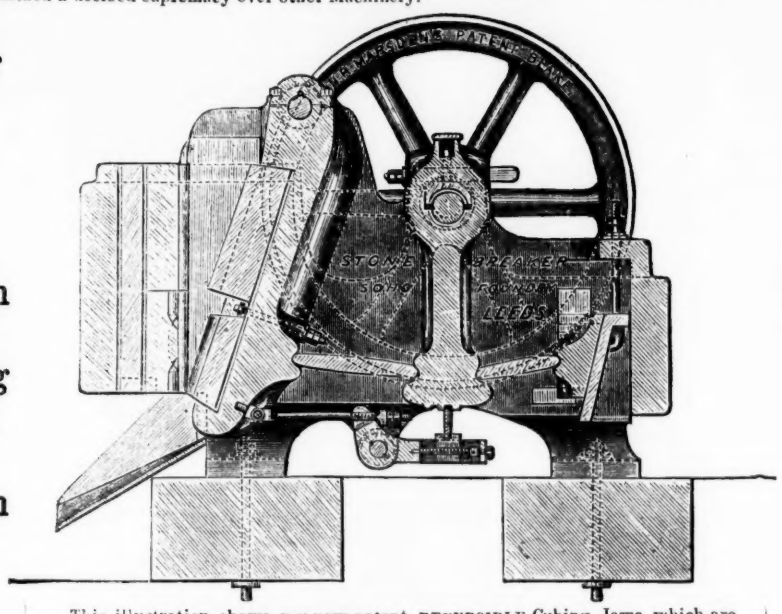

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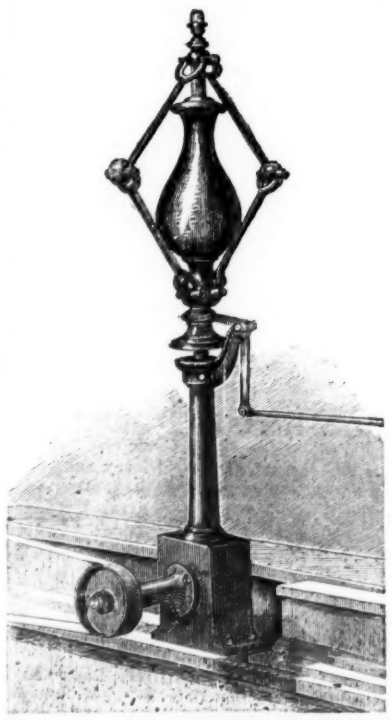

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